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JANUARY, 1938 No. 1

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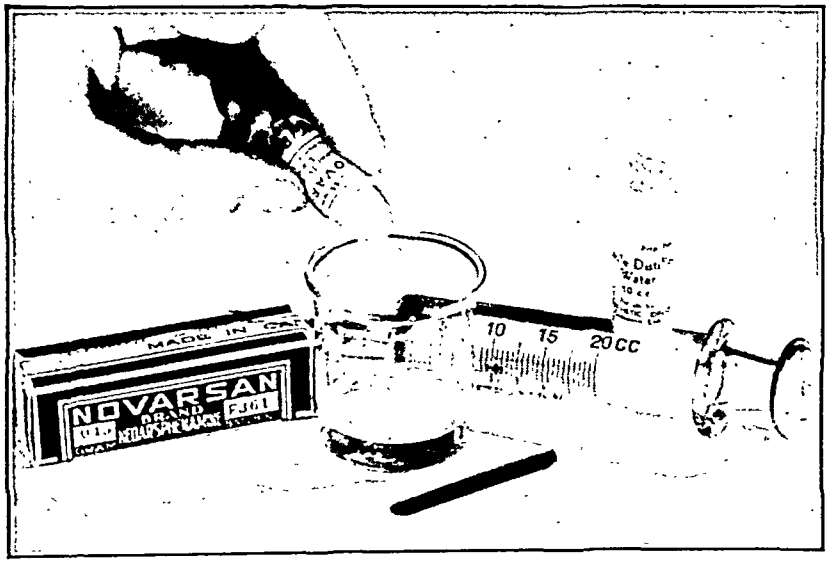
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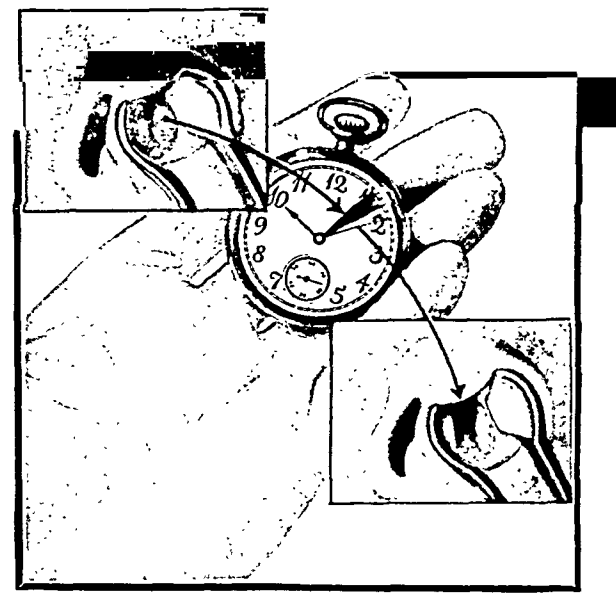
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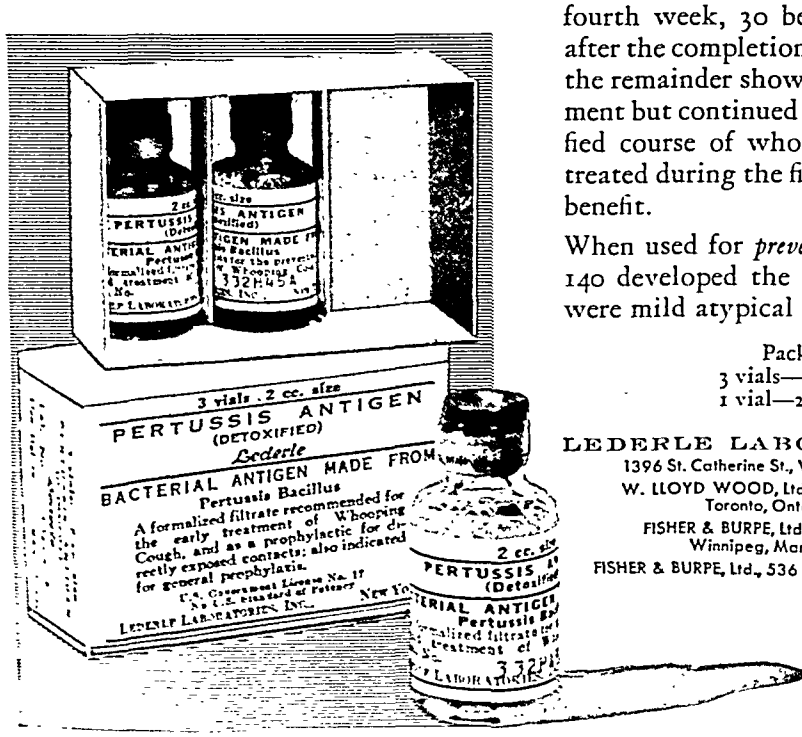
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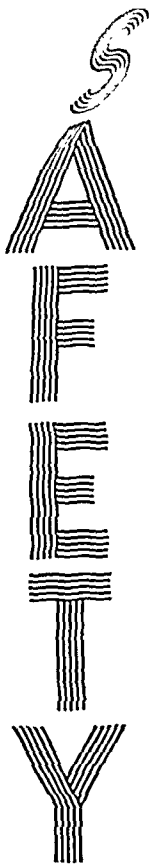
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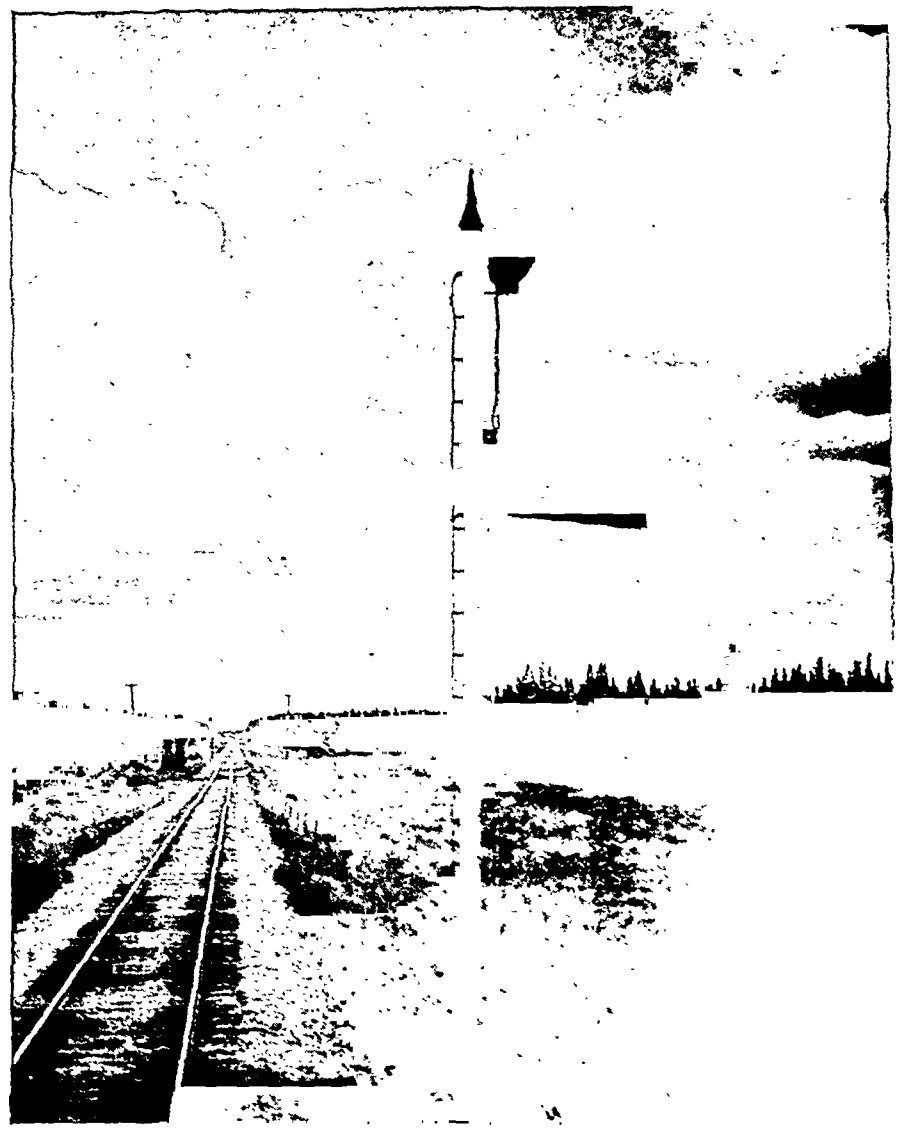
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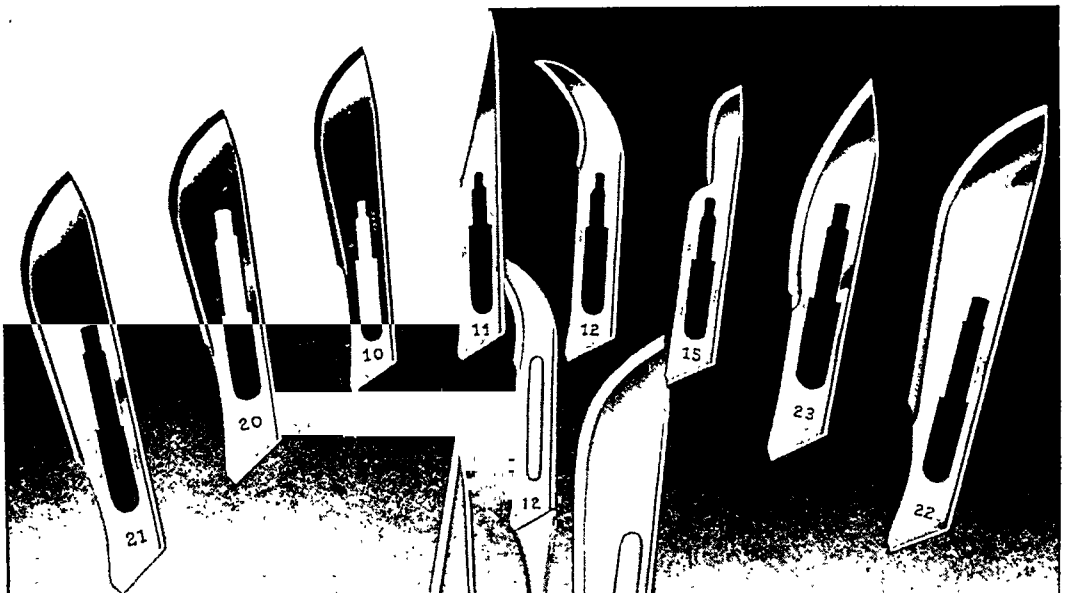


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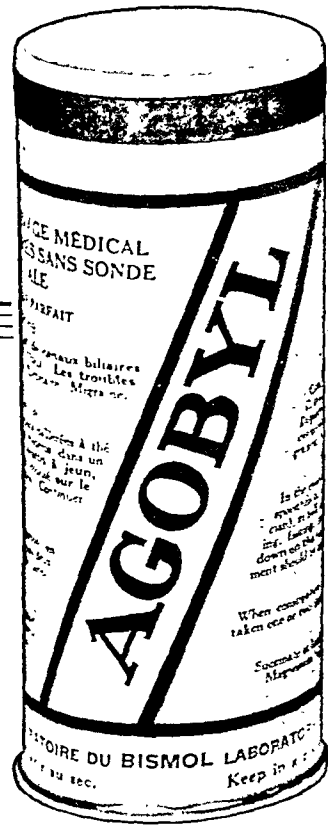
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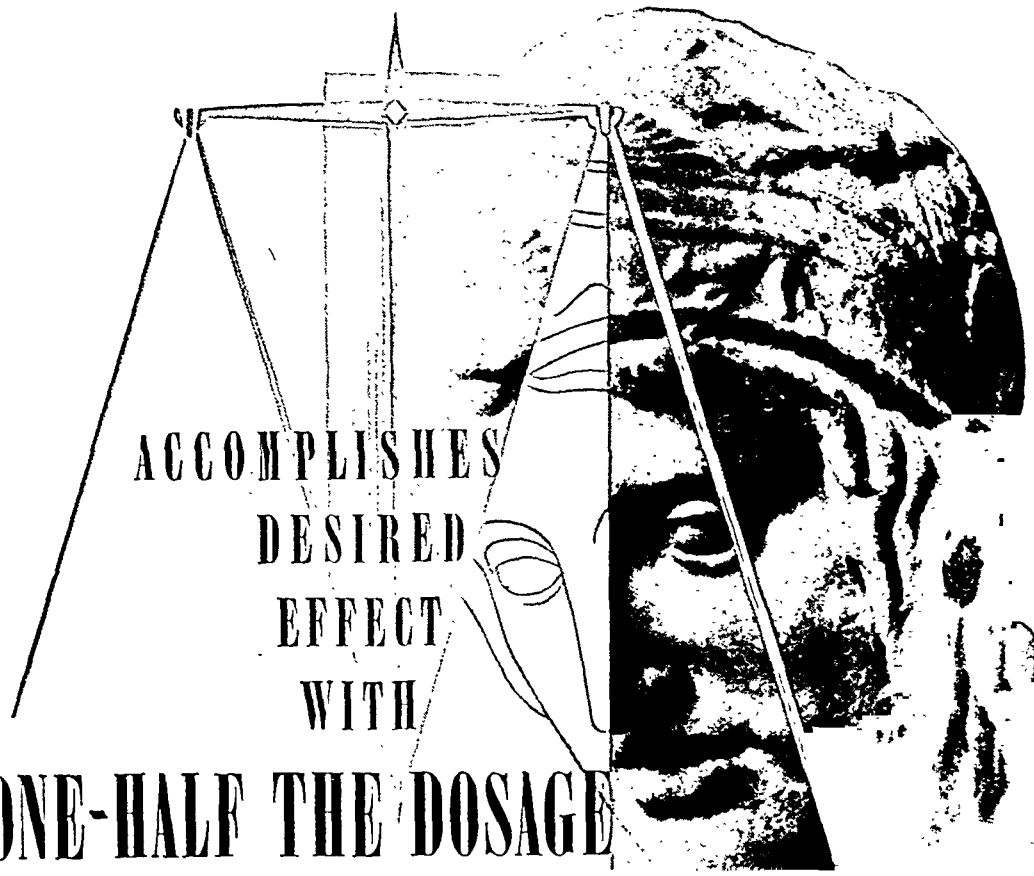
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SALPINGITIS*

BY SIR BECKWITH WHITEHOUSE, M.S.(LOND.), CH.M.(B'HAM.), F.R.C.S.(ENG.), F.C.O.G., F.A.C.S.(HON.)

Professor of Midwifery and Diseases of Women, University of Birmingham, Eng.

AS the subject of my communication for our mutual discussion I have selected inflammation of the uterine adnexa, and I have done so for various reasons. In the first place, it is a common meeting ground of the general and pelvic surgeon, and on the question of treatment the policy of the former is by no means always identical with that of the latter. Secondly, in its more chronic phases, the diagnosis of tubo-ovarian inflammation from other pelvic lesions, *e.g.*, pelvic appendicitis, ovarian or pelvic endometriosis, and pelvic tuberculosis, raises difficulties with which many of us are familiar and which certainly invite discussion. Lastly, salpingitis is common, and in general it is always more profitable to discuss common lesions than rarities which, however interesting in themselves, are not of such practical importance.

A few years ago it fell to my lot, in the short space of twelve months, to re-open ten abdomens where a so-called "chronic appendix" had previously been removed, and a deep-seated inflammatory lesion in the pelvis overlooked. I do not blame the original surgeons for removing the appendix, but what I do blame them for was not previously satisfying themselves that all was well in the deeper parts of the pelvis. I cannot overestimate the value of vaginal or combined recto-vaginal investigation in the diagnosis of cases where the diagnosis is in doubt, and when the patient's symptoms are all too frequently of little specific value. There are no such simple criteria as the well-known and often quoted statements that (*a*) epigastric discomfort in association with lower abdominal pain implies inflammation of the appendix; (*b*) that vomiting usually eliminates the possibility of tubo-ovarian inflammation; (*c*) that left- as well as right-sided iliac pain favours a diagnosis of salpingitis as opposed to appendicitis; (*d*) that cutaneous hyperæsthesia in the right iliac fossa is evidence of appendical inflammation; and so on. In practice exceptions to the above are always turning up, proving that the final opinion in a given case should be based, not upon the clinical history or symptoms but upon the results of a careful pelvic, as well as abdominal, examination, conducted, if necessary, under general anæsthesia. The presence of a small, deep-seated and adherent inflammatory tubo-ovarian swelling, whilst readily appreciated by the pelvic route, is easily overlooked when reliance is placed upon purely abdominal methods. Similarly, the recognition of thickening at the upper part of the recto-vaginal septum, and especially puckering of the posterior vaginal fornix such as occurs with endometriosis and peritubal adhesions in this situation, should prevent many a harmless appendix from being removed.

With acute lesions diagnosis is of still greater importance, as an error may cost the patient her life. I make this statement with full appreciation of its seriousness, as the treatment of acute pelvic peritonitis of tubal origin differs essentially from that of acute appendicitis. If it should happen that a wrong diagnosis has been made, things can be done

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Gynæcology, Ottawa, June 24, 1937.

or left undone which may be followed by most unfortunate sequelæ. I refer to the danger associated with the approach to, and removal of, an acutely inflamed tube of streptococcal origin, or the tapping of a streptococcal abscess per abdomen to the exclusion of the safer vaginal route.

In the chronic group of tubo-ovarian lesions there will always be cases, even after careful and thorough investigation, where the diagnosis remains obscure. Such are instances of inflamed appendages, possibly secondary to an infected abortion, where one or other tube is adherent high in the pelvis and out of reach of the examining finger. Chronic right- or left-sided iliac pain is often the only symptom. In such an exploratory laparotomy is indicated, but let the incision be vertical in the mid-line above the pubes. Only by this approach is it possible easily to explore by touch and vision the pelvic organs and the bottom of Douglas' pouch. Should the lesion prove after all to be appendical it can be dealt with quite satisfactorily through such an incision. On the other hand, if chronic appendicitis is suspected and the lesion should prove to be of tubal origin exploration of the deeper parts of the pelvis is difficult and unsatisfactory with the old "gridiron" incision in the right iliac fossa. The "Battle" or "right para-rectus" incision is adequate for dealing with lesions of the right uterine appendage or appendix, but may render approach to the left tube and ovary unnecessarily difficult.

From the point of view of treatment, I think, perhaps, that it will be most useful to discuss the problem under two headings, *viz.*, (*a*) acute and subacute infections of the Fallopian tube, and (*b*) chronic inflammatory lesions of the uterine adnexa.

Acute Salpingitis

Acute inflammation of the Fallopian tube may occur as a primary lesion or as the result of recrudescence or secondary infection of a pre-existing inflammatory lesion. This distinction is important, since, in the latter the extent of the conflagration is usually limited by extensive adhesions which in the former are commonly non-existent. It follows, therefore, that in severe primary infections there is a real danger of extension of the trouble to the general abdominal cavity, a risk which may be increased by injudicious methods of treatment. It is, I think, an accepted fact that the pelvic peritoneum is possessed of high powers of resistance to infection. This resistance diminishes rapidly in the general abdominal cavity, and, therefore, it should be our aim to limit the infection to the pelvis. An illustration of this fact is to hand in the grave results which attend tubal and peritoneal infection of puerperal origin when the uterus is still an abdominal organ.

Another factor to be considered is the nature of the infecting agent. The organisms responsible for acute tubal lesions usually fall under one of three headings, *viz.*, gonococci, streptococci, and "coliform" bacilli. Gonococcal infections are, perhaps, the least worrying in their immediate effects. Given time and palliative treatment, the majority subside, and the organisms die, the result being nothing more than closed tubes, a mass of pelvic adhesions, and associated chronic pelvic pain, which may eventually call for surgical treatment at a later but safe period. Streptococcic and coliform lesions, on the other hand, generally necessitate active interference during the acute stage. What should this interference be? My answer to you is drainage. The problems we have to consider in relation to the "acute tube" are, therefore, when should this be done, and how should it be done? My own policy is to delay active interference as long as possible, to do as little as possible, and as quickly as possible.

Nothing, in my opinion, is more dangerous in the presence of acute tubal inflammation than to embark upon a laparotomy involving the separation of such adhesions as exist, in an attempt to reach and remove an infected appendage. I learnt this fact quite early in my career. Fresh from the experience of dealing with acute appendical infection, I attempted to apply the same principles to acute lesions of the Fallopian tubes, and with disastrous results. It happened that the first three cases so treated were acute pyosalpinx of streptococcal origin. The Fallopian tubes were removed by the abdominal route, and all three patients died from streptococcal peritonitis. This taught me a very sound lesson! It made me appreciate the virulence of the infection that may lurk in an acute tube, and to approach the problem by methods other than

those with which I was already familiar. Also it made me recognize the fact that acute inflammation of the appendix and acute inflammation of the Fallopian tube are two entirely different problems which cannot be dealt with by a common policy. I have no doubt, now, that the safest course is not to remove uterine appendages when they are acutely inflamed. I am equally sure that the proper treatment is to provide free and adequate drainage when it is obvious from the clinical course of a case that the infection is not subsiding. This implies that there is frequently not the same urgency for surgical interference in the case of the acutely inflamed tube as exists with the acute appendix. Within reason, time is to the patient's advantage when infection is limited to the pelvis, in that it allows nature to erect a barrier to shut off the comparatively safe pelvis from the dangerous general peritoneal cavity. The importance of correct diagnosis, is, therefore, of paramount importance.

Let me next direct your attention to the route by which drainage should be effected. My own preference is for vaginal drainage through the posterior fornix whenever it is possible. There is no risk of infection of the general peritoneal cavity, drainage is effected at the lowest point, and there is no great disturbance of the inflamed tissues. The operation is not difficult, even in the case of double acute pyosalpinx, unless the affected tubes happen to be adherent at the level of the pelvic brim, when, naturally, an abdominal approach is preferable. When clinical evidence is available that infection of the peritoneum above the pelvic brim already exists, then laparotomy should be carried out by a small supra-pubic median incision, and drainage effected by carrying a split rubber tube down into Douglas' pouch between the affected uterine appendages. If pus is oozing from the Fallopian tubes, no attempt should be made to remove them. Bourne's plan of incision and drainage of the ampullary portion is, in my experience, correct, not because it may result later in a physiologically healthy appendage—a remote possibility—but because there is less disturbance of the tissues, and, consequently, less danger to the patient.

When an acute tubal infection has not resolved, either as the result of palliative measures or surgical drainage, but has ended in abscess-formation, the course of treatment is comparatively simple. The pus must, of course, be evacuated and the cavity drained. Fortunately, the majority of these abscesses locate themselves in Douglas' pouch and are easily reached by posterior colpotomy. There is no more simple and satisfactory operation than the drainage of a large pelvic abscess by this route, and the ultimate results are often surprisingly good. I refer you to Table I which gives the results of 33 cases of acute pyosalpinx and pelvic abscess treated in my Clinic by this method. You will notice that the immediate mortality is nil. It is interesting also to find that amongst 18 patients where pregnancy was possible 3 subsequently became pregnant. One woman, indeed had three children after a large pelvic abscess had previously been drained *per vaginam*, showing that irretrievable damage is not necessarily done to physiological function by the occurrence of suppuration in the pelvis. Fourteen patients out of 22 reported themselves as physically fit at least five years after operation, and in only one case had a second operation been necessary.

Referring to the cases of abdominal drainage (Table II) one operative death is recorded in a series of 25. Here again, it will be seen that 2 patients reported the fact of subsequent pregnancy. The percentage of cases requiring later operation is, however, higher in the abdominal than in the vaginal group, and the general standard of subsequent health does not appear to be so good.

The risk attached to removal of an acutely inflamed appendage is shown in Table III, where three deaths are recorded. This table does not include the deaths to which I have already referred, and which occurred at an earlier date. I may add, however, that the mortality in the table is entirely associated with acute and not chronic cases.

Palliative treatment.—What is the position of purely palliative measures in relation to acute salpingitis? It is, perhaps, a little difficult to reach a correct opinion when the matter is viewed from a British hospital standpoint. The virulence of infection usually dominates the situation, and of the cases admitted to our voluntary hospitals the majority of women are suffering from severe lesions where operation is imperative. Accommodation is not possible for

the less acute infections, and such patients are generally treated at home or referred to other institutions where the bed problem is not one of such pressing importance. There is no doubt, therefore, that a large number of patients in Great Britain are, for this reason, not seen in the first instance by the gynæcological surgeon.

Under the influence of ordinary palliative measures, rest, application of heat, saline purgation, and so forth, many cases of subacute salpingitis subside, at any rate for a time. Later, the gynæcologist sees the result of infection in the shape of closed tubes, associated with chronic pelvic pain, dyspareunia, etc., but only when the case has passed into the chronic phase. In this respect salpingitis and appendicitis have something in common. Acute virulent infections bring the patient to hospital at once. Subacute infections are only brought to our notice when by reason of repeated attacks or the persistence of symptoms additional help in treatment is required.

SUBACUTE SALPINGITIS

Let us consider for a few moments the management of these subacute cases. They are not by any means easy problems, for there is always the danger that by too vigorous treatment infection may be spread. Immediate surgical intervention has no place in the treatment of subacute salpingitis. Drainage is not called for, and removal of the affected tubes may not only be unnecessary but actually dangerous. In recent years my practice, in common with others dealing with cases of this type, has been to apply heat *per vaginam* by means of the Elliott apparatus. There is nothing new in the application of heat to pelvic inflammatory lesions. In the old days, and also today, when other means are not available, the hot vaginal douche holds an honoured place. When it is employed, my only comment is, let it be hot enough, let it be copious enough, and let it be frequently administered. To produce any material effect, douching should be repeated at least every four hours.

Appreciation of the good effects of sustained heat applied *per vaginam* to the pelvic organs and of the inconvenience attached to ordinary vaginal douching has led to the introduction of newer methods of attaining the same end. When visiting a large clinic in Amsterdam I was shown a number of cases of subacute salpingitis being treated with infra-red rays, by means of vaginal applicators. There is nothing very special about infra-red light, as many of you know. It is merely a spectacular method of applying heat easily and efficiently. The Elliott apparatus I regard as another modern luxury method; it has the advantage that heat generated by electricity can be diffused throughout the pelvis at a progressively increasing temperature, and for as long as may be desired in the individual case.

CHRONIC SALPINGITIS

There remains for consideration the treatment of what I may call "the chronic tube". In this category we include not only examples of chronic pyosalpinx and hydrosalpinx, but also cases of densely matted and adherent uterine appendages, with much thickened tubal walls—so-called "chronic interstitial salpingitis". These are the aftermath of acute lesions, or the result of infection by less virulent strains of organisms than are responsible for the troubles we have been discussing.

There is one essential difference between acute and chronic salpingitis, *viz.*, that in the latter the infecting agent has generally shot its bolt and is dead. There is, therefore, very little if any danger attached to the escape of pathological fluids from a chronic pyosalpinx in the course of removal of the affected tube.

The treatment of chronic salpingitis suggests a variety of topics for profitable discussion. In the first place I think that I may put the question, is surgical treatment preferable to non-surgical or palliative measures? In the presence of gross lesions I have no hesitation in strongly advocating the former. Once a Fallopian tube has been so damaged by chronic inflammation that it is palpable *per vaginam* or *per rectum* as a swelling in one or other posterior quadrant of the pelvis, it never, in my experience, recovers. Moreover, its presence is a constant menace to the comfort and well-being of its unfortunate possessor. Ladies of leisure, and those who, perhaps, do not mind a life of semi-invalidism, may prefer "the ills that be"—etc., but to the woman who has to take an active part in the affairs of life, the presence of a "chronic tube" usually spells disaster. The occurrence of constant pelvic pain, profuse and painful menstrua-

tion, dyspareunia, etc. usually, in the case of the working woman, decides the issue.

The next point we have to consider, if the axiom is accepted that surgical treatment is indicated, is the nature of this intervention. Here I submit that laparotomy is the operation of choice. There is no place in my opinion for vaginal methods, although I know that vaginal hysterectomy with removal of inflamed appendages is practised by the Viennese school of pelvic surgeons. The extirpation of a chronic tube may prove to be a very trying procedure. Indeed, I know of no more difficult operation than is sometimes involved in the dissection of tubes densely adherent to adjacent viscera. Fortunately, this is not always the case, as when the correct plane of separation is located chronic inflamed uterine appendages of long-standing may, on occasion, be enucleated without difficulty. This fact cannot, however, be ascertained beforehand, and, therefore, to my mind, the abdominal route is to be preferred in all cases.

In spite of possible difficulties to which I have referred the removal of chronically inflamed tubes *per se* is by no means a dangerous operation. This is shown in Tables III and IV. In a series of 53 consecutive cases of chronic salpingitis (including pyosalpinx and hydrosalpinx) both tubes were removed with no mortality. In Table III covering 92 cases of unilateral salpingectomy it will be noted that 3 women died. These, however, were acute cases, and the danger of such intervention has already been emphasized. Eliminating the deaths associated with acute lesions, it is possible to submit a combined series of 142 consecutive cases of salpingectomy with no mortality. I think, therefore, we may regard it as a safe procedure.

The true value of treatment can, however, only be judged by its ultimate results, and certain information is obtained in the records of the "follow-up" contained in the tables which I submit. You will see from the "questionnaire" the type of information which we desired to obtain. Without going into detail it will be useful to refer to one or two matters of practical value. It is important to know, *e.g.*, whether removal of one or both tubes is sufficient to restore a woman to good health, such that she is able to take her place as a useful member of the community. Taking Tables III and IV together, you will note that out of 99 replies, approximately 83 per cent reported that they were in good or fair health. The failures in this respect registered approximately 16 per cent; 76 per cent were able to carry out their full duties; another 20 per cent undertook light work; and 3 per cent only were incapacitated. These figures, however, should also be taken in conjunction with the necessity or otherwise for treatment subsequent to the initial operation. It will be seen on reference to the appropriate heading that of 67 cases where one tube only was removed 13 later required additional treatment. This varied from "expectant" or "palliative", in the case of 5, to hysterectomy in 6, and removal of the remaining appendage in 1. Amongst 31 double salpingectomies hysterectomy was subsequently required in 4, owing to the persistence of pelvic pain. In other words, we may say that in 17 patients out of a total of 98 the original operation had been incomplete. It had been safe so far as mortality was concerned, but is it justifiable to argue that it is best if it involves the possibility of additional treatment later in approximately 17 per cent of cases so treated? What is the alternative? The answer is, hysterectomy with removal of both tubes. Now, hysterectomy may be a very serious proposition when it is performed for the radical cure of chronic inflammatory disease of the female pelvic organs. The successful removal of long-standing double pyosalpinx, together with the uterus, the whole being densely adherent to all adjacent tissues, can be one of the most difficult operations in pelvic surgery. In my opinion, it is definitely more troublesome than hysterocolpectomy for cervical carcinoma. It is not surprising, therefore, that the procedure is associated with a higher rate of mortality than is associated with hysterectomy performed for other reasons, for example, fibroids. In a series of 137 hysterectomies, total and sub-total, performed in my clinic between the years 1911 and 1923 for diseased appendages, and recorded in a communication to the British Congress of Obstetrics and Gynæcology in Manchester, 1927, the immediate mortality was 7.5 per cent. During the same period the initial mortality in the case of 250 conservative operations was 1.2 per cent only. During the next 10 years, *i.e.*, up to 1933, my registrar informs me that only 30 hysterectomies for pelvic inflammatory disease have been performed. During the same period 243 cases

THE AFTER-RESULTS OF 244 CASES OF SALPINGITIS TREATED AS IN-PATIENTS AT THE GENERAL HOSPITAL, BIRMINGHAM, ENGLAND, FROM 1913 - 1932 (INCLUSIVE) BY CONSERVATIVE METHODS

The figures contained in the following Table are compiled from answers to the attached "Questionnaire" and show the state of health after periods varying from 5 to 20 years from the initial treatment.

TABLE I.

PELVIC ABSCESS & ACUTE PYOSALPYNX, 1913-32

Treated by Posterior Colpotomy and Drainage

TOTAL CASES 33

MORTALITY	Immediate	0		
	Remote	1	(6 years after operation)	
PRESENT HEALTH	Good	14		
	Fair	4		
	Poor	4		22
CAPACITY FOR WORK	Normal	15		
	Light	6		
	Nil	1	(due to amp. of leg later)	22
PREGNANCY	Full-term	3	(1 pregnancy 1) (2 " 1) (3 " 1)	
	Abortion	0		
	Nil	15		18
MENSTRUATION	NORMAL	9		
	Menorrhagia	6		
	Menorrhalgia	4		
	Amenorrhœa	5		24
VAGINAL DISCHARGE	Present	6		
	Absent	16		22
DYSPAREUNIA	Present	2		
	Absent	20		22
SUBSEQUENT TREATMENT	Nil	21		
	Required	1		22

TABLE II.

PELVIC ABSCESS, 1913-32

Treated by Abdominal Drainage only

TOTAL CASES 25

1		
1	(3 years later)	2
9		
5		
0		14
11		
3		
0		14
2	(1 case—1 pregnancy) (1 " —2 ")	
0		
5		7
12		
1	(slight)	
1		
0		14
2		
12		14
3		
11		14
9		
5		14

TABLE III.

SALPINGITIS & PERIMETRITIS 1913-32

Treated by removal of one Appendage only

TOTAL CASES 92

3	(acute)	
1		4
36		
20		
12	(1 in Asylum)	68
50		
15		
3		68
13	1 gestation—5 cases 2 " —5 " 3 " —1 case 4 " —1 " 5 " —1 "	
4	(amongst above 12 fertile patients)	63
50		
32		
10		
13		
17		72
21		
46		67
20		
47		67
54		
13	6 subsequently had Hysterectomy 1 " " remaining appendage removed 1 " operation for "Appendicitis" 5 treated "expectantly"	

TABLE IV.

CHRONIC SALPINGITIS, 1913-32

Treated by removal of both Tubes but not Uterus

TOTAL CASES 53

Nil		
Nil		
21		
6		
4		31
26		
5		
0		31
0		
1		
9		10
21		
2		
2		
8		33
N.B. Includes 2 cases of Ovarian Grafts in Rectus Muscle. In 1 case Menstruation was normal for 7 years.		
8	("1 v. bad")	
23		31
9		
22		31
27		
4	(Hysterectomy for Pelvic pain)	31

TABLE V.

SALPINGITIS, 1913-32

Treated by Salpingostomy

TOTAL CASES 15

Nil	
Nil	
7	
1	
4	12
10	
2	
0	12
0	
0	
9	9
including 2 cases of tubal grafting	
7	
3	
1	
1	
2	13
3	
9	12
2	
10	12
8	
4	12
2nd operation required in 3 cases for Salpingitis and 1 for non-pelvic condition.	

TABLE VI.

SALPINGITIS & PERIMETRITIS 1913-32

Treated by Laparotomy and separation of adhesions only

TOTAL CASES 13

1	
1	2
3	
2	
3	8
5	
3	
0	8
3	1 gestation—2 cases 2 " —1 case
1 (amongst above 2 fertile patients)	
4	7
3	
1	
1	
3	8
4	
4	8
5	
3	8
5	
3	2 treated by expectant methods and both became pregnant. 1 had Amenorrhœa after 2nd operation, presumably Hysterectomy.

TABLE VII.

PELVIC INFLAMMATION

Treated without operation

TOTAL CASES 13

Nil	
Nil	
6	
1	
3	10
7	
1	
2	10
4 (3 cases 1 gestation)	
(1 case 2 ")	
0	
2	6
7	
1	
4	
1	13
3	
7	10
3	
7	10
7	
3	10

TABLE VIII.

PELVIC INFLAMMATION

Summary of Results of Conservative treatment

TOTAL CASES 244

MORTALITY	Immediate	5	
	Remote	5	10
PRESENT HEALTH	Good	96	
	Fair	39	
	Poor	30	165
CAPACITY FOR WORK	Normal	124	
	Light	35	
	Nil	6	165
PREGNANCY	Full-term	25	
	Abortion	6	
	Nil	91	125
MENSTRUATION	Normal	91	
	Menorrhagia	24	
	Menorrhalgia	26	
	Amenorrhœa	36	177
VAGINAL DISCHARGE	Present	47	
	Absent	117	164
DYSPAREUNIA	Present	44	
	Absent	120	164
SUBSEQUENT TREATMENT	Nil	131	
	Required	33	164

GENERAL HOSPITAL,

BIRMINGHAM, ENGLAND

Gynæcological Department

FORM OF "QUESTIONNAIRE"

Name.

What is the present state of your health?

Are you able to carry out your usual work, household or otherwise?

If married, have you become pregnant since the operation?
If so, how many times?

Have you had any Miscarriages since your operation?

Are your Monthly Periods excessive or painful?

Have you at present any discharge from the front passage?

Have you any pain on connection with your husband?

Have you been treated at any other Hospital since you left the General Hospital?

Have you had any more operations?
If so, where?

(both acute and chronic) have been treated by less drastic methods. It is interesting to find that none of the hysterectomies were lost, whilst the immediate mortality from the 243 other operations was only 0.8 per cent higher, *viz.*, 2.0 per cent. The combined initial mortality for the old series of 387 cases was 2.5 per cent; for the new series (273 cases) it is 1.8 per cent. The difference is entirely accounted for by the reduction in the number of hysterectomies performed in my clinic since the Manchester Conference. It was somewhat disturbing to know that every time I performed a radical hysterectomy for double pyosalpinx I was facing a possible initial mortality of over 7 per cent. Since that time hysterectomy in these inflammatory cases has not been performed nearly so frequently. Cases have been selected more carefully, and the major operation carried out only if, and when, absolutely necessary. Another factor which may have contributed to the lower mortality is a change of technique in the more difficult cases. I now use the method advocated by Munro Kerr, of Glasgow, of splitting the uterus into two halves and removing each half separately from below upwards. An adherent appendage can be separated more easily from the pelvic colon and pelvic wall from below than from above, and there is, consequently, less risk of damaging adjacent viscera. In a really difficult case this technique is well worthy of adoption.

Once the pelvis is safely and thoroughly cleared of both uterus and diseased appendages, there is no doubt that the patient is the better for it. In 15 out of 16 replies received in my later series we found that the women could carry out their normal duties. No additional treatment had been required in any instance. The case, in fact, was finished. The problem I put to you, therefore, is, should our policy be to face greater immediate risk and attempt to reduce the mortality attached to the radical operation, or be satisfied with a comparatively safe method, even if it does involve the possibility of later intervention in 17 per cent of cases?

Unilateral Salpingitis

Many of us are familiar with the occasional case which at operation presents the picture of a grossly damaged tube on one side with a less obvious lesion or an apparently healthy organ on the other. The correct procedure under these conditions is rather a difficult problem, for in ascending infections we know only too well that inflammation of the second tube commonly follows a severe lesion in the first. It is very disturbing, however, both for patient and surgeon to be faced with the possibility of a second laparotomy within a few months of the first. Should both tubes, therefore, be removed at once on the basis that number two is practically certain to be involved later on?; should an attempt be made to sterilize the second tube by the injection of an antiseptic, *e.g.*, acriflavine?; or should the surgeon be content in dealing with what he actually sees? Personally, I find the question difficult to answer, especially as I have had to operate on more than one occasion for subsequent infection of a second tube. I am not satisfied with the proposition to attempt sterilization of the second tube and uterine cavity at the time of the first operation, for I do not think that it is possible, although the technique is easy. I am almost convinced, therefore, that double salpingectomy is justifiable in the presence of a severe lesion in one tube, even if the other does not exhibit any gross lesion. Such patients, in my experience, are commonly sterile, even if the remaining tube is left (70 per cent in my series), and it seems to me better practice to safeguard the ovary or ovaries from the possibility of recurrent serious inflammatory lesions than to adopt the rôle of an optimist, which in this instance is hardly justifiable. Twenty-four per cent in my series of unilateral salpingectomies required later treatment. I need hardly emphasize the importance of explaining the position fully to the patient and her husband before the problem has to be faced in the operating theatre. It is obvious that the point at issue may then be decided by considerations other than purely medical. To perform an operation which sterilizes a patient against her knowledge, even if it is to her medical advantage, is, of course, grossly improper.

Conservative Operations on the Fallopian Tube

Finally, I come to the question of conservative operations upon the Fallopian tubes, but I do not intend to weary you with it at length, I know that some gynæcological surgeons wax

eloquent upon the possibilities of conservative surgery applied to the Fallopian tube. I can only tell you that my personal experience of salpingostomy and tubal grafting is such that I do not feel justified in advocating it. Possibly my experience is not large enough, or my methods are incorrect, for out of 15 salpingostomies (Table V) not a single patient subsequently became pregnant. Moreover, in three of these patients a second operation was necessary at a later date to remove the tubes on account of persistent pelvic pain. The trouble with salpingostomy and, for that matter, with tubal grafting also, is that, even if patency of the upper genital tract is successfully effected at the time of operation, adhesion of surfaces occurs subsequently and the purpose of the operation is undone. Possibly the use of papain, recently introduced, may prevent this danger and improve the results of an operation which I now very rarely perform.

Since the narrowest part of the Fallopian tube is the isthmic portion and closure of the lumen is common at this site, it follows that tubal grafting should have greater possibilities than a simple salpingostomy. Those who have done many of these cases tell us that they have had successes. Personally, I can only remember two instances where pregnancy followed the grafting of both tubes into the uterine wall. I have performed many operations where the result has been otherwise, and my present position is that whilst I regard a physiological result as possible from tubal grafting I think it is improbable. We must always remember that whilst our successes remain prominently before our minds, we only too frequently forget our failures. It is only when our registrars get busy and bring to light the results of treatment over a period of years, that our "swans" become "geese", and we find that at best we are but very ordinary exponents of our art.

THE PLACE OF RADIUM IN TREATMENT OF CANCER*

BY ANTOINE LACASSAGNE, M.D.

Radium Institute of the University of Paris,

Paris

THE recent prospecting for mineral riches in Canada foreshadows enormous reserves of radium. Veins are known from which it is estimated that tens of kilograms of this metal could be extracted. Canada seems to be taking the first place in its production. The friends of this country rejoice in its good fortune, which permits it to foresee matchless equipment for curietherapy. As it is especially in the treatment of cancer that the use of such large quantities is contemplated, the time seems favourable to discuss the place of this agent in cancer therapy.

THE PROGRESS REALIZED IN RADIOTHERAPY OF CANCER

One cannot analyze the progress made in the last 35 years, that is to say, since the discovery of radium by Pierre and Marie Curie entered into the medical armamentarium, without at the same time relating the history of the development of roentgen therapy, for these two branches of radiology have had a parallel development, reciprocally benefiting by the progress made either by one or the other. So far as the treatment of cancer is concerned, these are two methods which result in the same biological effects, through the use of agents very similar in their physical nature, especially since Dominici demonstrated the advantage of utilizing the "ultra-penetrating" rays of radium, namely, the γ rays alone.

The many new facts which have accelerated the evolution of radiotherapy in cancer have been gained from three principal fields of research: (*a*) radiobiology, or the study of the mechanism of action of the rays on living elements; (*b*) radiosensitivity of cancer, a new chapter in the physiopathology of tumours; (*c*) the adaptation of the material to technical ends, which has profited by the results obtained in the two preceding approaches.

Certain articles or regulations in regard to the radiotherapy of cancer have gradually de-

* Read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Ottawa, June 23, 1937.

veloped. It is generally accepted today that radiation principally exercises a direct action at the moment of its absorption in the cells, whose structure it disintegrates; it is also admitted that the average quantity of radiation necessary to provoke complete destruction of the cells varies with each type of cell; and, finally, that the disappearance of a cancerous cell will result from the absorption of this average quantity of radiation according to its radiosensitivity, and that the radiation must be equally distributed to all the constituent elements. In the presence of a malignant tumour the specialist must begin immediately the studies which will furnish him the three essential facts of the problem—the histological variety, the site, and the extent of the lesion.

In the case of a tumour of a common variety the *histological diagnosis* usually permits one to estimate approximately the degree of radiosensitivity. At the same time it furnishes important information as to the character of the malignancy, the probable speed of the disease, and the chances of metastases.

According to the *site*, the radiologist calculates the percentage of radiation capable of reaching the deepest part of the tumour. The task of bringing about the absorption of the mean quantity of radiation necessary determines the quality of the radiation and the portals of entry to be used. These last are chosen with a view to concentrate the rays on the diseased territory, but also to avoid injury to normal sensitive organs, which it is useful and sometimes necessary to respect.

The more or less great *extent* of the territory invaded, and hence necessary to treat, influences in its turn the dimensions and the number of fields. The obligation to avoid severe general reactions, which can result from a too large extent of irradiation, likewise leads to a choice in the quality of the radiation to be utilized, as well as in the fractioning and distribution of the doses. Over the course of years, more and more complicated apparatus has been placed in the hands of the radiologists, furnishing them with an intense flow of rays, either very absorbable or very penetrating.

THE DISPARITY BETWEEN ROENTGEN- AND CURIE-THERAPY

The cure of a cancer may be obtained with radiation by two different techniques: (*a*) caustic destruction; (*b*) selective sterilization. In the first case, the rays bring about the necrosis of all the tissue included in the field, whatever the type or nature. One can easily produce this phenomenon by causing the absorption in an organ of a large quantity of soft rays; but the long wave-length of these rays causes their absorption only to a slight depth. Hence this procedure is only applicable, practically, to those varieties of tumours which are superficial, well limited, small, and of little thickness. Selective sterilization proposes to cause the death of neoplastic cells, while respecting as much as possible the normal elements. It relies upon a definite difference between the radiosensitivity of the more resistant healthy tissues and the more fragile pathological tissues. Its use can thus only be contemplated against certain types of cancers. On the other hand, in the case of a very favourable radiosensitivity the site and extension of the tumour become of secondary importance, on condition that one uses a ray of short wave-length.

In the beginning of radiotherapy the first of these procedures was alone employed, both by the use of unfiltered x-rays and by the use of radium, utilizing its "total radiation". It was originally applied to superficial lesions. Then, encouraged by some results obtained in certain highly radiosensitive tumours, and better armed in the matter of instruments, therapists began to attack cancers more deeply situated. From this time on the techniques of roentgen- and curie-therapy began to diverge. X-rays could be produced in great quantity, but one obstacle hampered their efficacy—their insufficient penetration. Their use was gradually reserved for the treatment of extensive cancers of slight depth (those of cancer of the breast, for example), or deep but extremely radiosensitive lesions (such as lymphosarcomas). Concerning radium, the advantage of the extreme power of penetration possessed by its γ ray was strongly counterbalanced by the small quantity of the substance at one's disposal — several centigrams only in the case of the most fortunate therapist. It is true that one could introduce into the interior of the natural cavities, and even into the tissues themselves, these minute radiogenic ampoules, from which arose an ingenious adaptation of the material,

favoured by the use of radon, permitting the administration of the rays in cancer locations up to then untreatable—the nasal fossæ, mouth, œsophagus, pharynx, uterus, bladder, prostate, etc., but these attempts have not all given satisfactory results, because of inaccuracy in the placing of these small sources and the limitation of their field of action.

Summarizing, during this second period in the history of radiotherapy it was demanded that x-rays furnish large quantities of moderately penetrating rays. On its side, radium permitted the application of a very penetrating radiation, but which, because of its minimal intensity, could efficaciously exercise its action only over a limited territory.

For some time now there has been a reversal of this situation. The power of x-ray apparatus has increased greatly; irradiation with 200 kilovolts has become common; stations utilizing 300, 600, 700 kilovolts are in operation in certain countries. In several institutions in the United States installations have been made which assure a therapeutic service with a ray of a million volts, submitted to regular control. The difference between the quality of the x and γ rays is thus considerably reduced.

Curietherapy has, on its part, increased its possibilities, owing to the preparation of ever greater quantities of radium. At the present time there are institutions which utilize sources containing several grams of this metal, irradiating at a distance of several centimetres from the body, under conditions approaching those of an x-ray tube. However, at the Institut du Radium of Paris, for example, where, under the direction of Dr. Regaud, experimentation has been carried on for many years with an apparatus containing 8 g. of radium, neither x-ray nor the small apparatus of curietherapy has lost its indication.

THE REASONS FOR THE CHOICE OF RADIUM IN THE TREATMENT OF CERTAIN CANCERS

The exploratory work on the action of radiation in cancer may be considered as finished, at least provisionally, until the intervention of a new element of progress. All the principal types of neoplasms have been tested, and one can schematically divide them into three groups: (1) the radiosensitive cancers, that is to say, those often curable by radiation, which include, in a descending order, sarcomas of the hæmatopoietic system, germinal epitheliomas, lymphoepitheliomas, pilo-sebaceous epitheliomas, stratified epitheliomas of mucous membrane and cutaneous type; (2) cancers slightly radiosensitive, which one sometimes cures by radiation, comprising the adenocarcinomas of the breast, visceral adenocarcinomas, those of the mucosæ of cylindrical cells, and sarcomas of connective tissue; (3) the radioresistant cancers, which one cannot cure by a selective action of radiations, such as the rhabdomyosarcomas, nævocarcinomas, and many tumours of nervous origin.

Among the neoplasms appearing in the preceding list are those which one treats more usually with radium. What are the reasons for this preference? The anatomical site often determines the choice of the radiating agent. Two localizations wherein radium intervenes as the principal element in the cure of certain cancers are the buccal cavity and the uterus, including the cervix uteri.

The greater part of cancers of the mouth were incurable until the perfection of the technique of radium therapy permitted one to obtain a small, but notable, proportion of cures. This forward step was the result of the utilization of favourable conditions peculiar to the region. In fact, localizations such as the anterior portion of the tongue permit a correct implantation of radioactive needles; in others, such as the floor of the mouth or the hard palate, a small radiating apparatus can be applied without great difficulty; in other regions, finally, such as the buccal surface, one can produce a cross-fire at close distance very efficaciously. Neither penetrating roentgentherapy nor telecurietherapy from a source of several grams has been able to supplant these little radium applicators introduced into the mouth for the treatment of cancer in this cavity, with the exception of certain highly radiosensitive varieties, for example, those frequently met with in the region of the tonsils.

The tongue furnishes a particularly good example. Cancers arising in the anterior part of the dorsum of this organ are almost all epitheliomas of epidermal type, consequently, within the sphere of favourable radiosensitivity. One can cure an important proportion of these by the introduction of radioactive foci. However, radiation of the cervical adenopathies which frequently accompany these cancers still

remains ineffective. In the tongue, the brutal radiation from foci of low filtration, exercising an action at a short distance from the cancerous cells in the midst of which they are plunged, produces destruction of the cells, but the principal difficulty is to avoid necrosis of the healthy tissues. This technique is inapplicable against the lymphatic spread; since moreover, the insufficient radiosensitivity of the cancer does not allow one to rely upon a selective destruction of all the neoplastic cells, in a region scarcely favourable to radiation, one prefers to associate radium-puncture of the tongue with a surgical resection of the adenopathy.

Epitheliomas of the cervix uteri offer a subject for discussion which is equally interesting. It is less and less contested today that this cancer is outside the domain of surgery; with the exception of certain rare indications it should always be irradiated. Statistics demonstrate a high percentage of cures when the treatment is begun before the lesions are too extensive. But they demonstrate also the important part that radium plays in these cures. The results (which are beginning to be known) obtained by radiation utilizing an external source of penetrating rays only (x-rays of one million volts as well as γ) remain markedly inferior to those given by the combination of these same irradiations with an intra-cavitary utero-vaginal curietherapy. This local application still constitutes an essential factor in the cure of a great number of cases.

In other cancers roentgenotherapy is, at the moment, advantageous. Thus, it has advantages in the treatment of highly radiosensitive neoplasms, with a rapid and extensive course, capable of spreading far, for example, the lymphosarcomas, seminomas, and germinal epitheliomas of the ovary. One may hope to obtain a sterilization by means of x-ray apparatus permitting the use of very large fields and a long focal distance. These conditions are actually not realizable with telecurietherapy. It is also the case, but for other reasons, in regard to the epitheliomas of the pharynx and larynx the treatment by x-rays has been perfected to a degree which curietherapy, it seems, has not reached.

Finally, too many cancers, among the most frequent, do not respond in a satisfactory manner to radiation, notably, the epitheliomas of the digestive tract, those of the bladder and prostate, etc.

What may we hope to obtain from the use of sources of γ rays exceeding largely in power those in actual use, containing several tens of grams of radium, and acting at a distance of several tens of centimetres from the skin? Is telecurietherapy destined to replace roentgenotherapy under the indications wherein this latter still holds privilege? will it be for curietherapy to widen the field of efficacy of radiotherapy in those cancers remaining up to now refractory to this treatment?

THE FUTURE POSSIBILITIES FOR THE USE OF RADIUM

In attempting to foresee the place which radium will be called upon to take in the therapy of cancer one risks being classed as a light-witted soul, to say the least. Are we authorized to speak of the future of radiotherapy in this domain? Certainly, it is still in its rudimentary stage. But if radiation has undoubtedly transformed the therapy of cancer, one must however recognize that the hope which it has lent to many patients, for the treatment of whom one could propose nothing else, is too often misplaced, and also that, in a considerable proportion of cases when one attempts its use it is with the hope of a mental amelioration, knowing in advance that it cannot act upon the cells of a radioresistant neoplasm.

We may justly be permitted to imagine some adjunct or other, of a biological, physical or chemicotherapeutic nature, which would reverse the situation by enabling us to strike the neoplastic elements more effectively. Do not some already see in the neutrons a substitute for x-rays and radium? But one may imagine a discovery in an altogether different field which will lead to the cure of cancer by other methods than radiation, or by preventing its production, as a result of a better understanding of its causes. Let us agree, then, that if we put up the question of the future of curietherapy it is on the assumption that the situation with respect to cancer treatment rests as it is today.

One may thus consider as certain that at some future time one can have at his disposal for purposes of treatment sources of γ rays containing several tens of grams of radium. There is no

doubt but that the destructive effects on the neoplastic tissues actually now realizable by x-rays will be possible under as favourable conditions with such apparatus. From this point of view, and especially if the question of price is in favour of radium, one would be led to conclude that curietherapy would supplement all other agents in the radiotherapy of cancers. However, before closing the question, one must also weigh the argument of protection, in particular that of the personnel. In this respect x-rays have an enormous advantage over radium. The obligation to protect from the radiation throughout the duration of the treatment of the patient (necessarily long, if carefully done) the doctor and nurses who carry it out represents a problem already difficult in connection with the existing large foci of radium. It will become all the more difficult when the radioactive substance is multiplied ten times. The thick walls of lead, putting the source at a distance only temporarily, can never be so simple or so economical as the opening and closing at will of an x-ray switch. But, however intense may be these beams of very short wave-length rays (coming either from a radium or x-ray apparatus still more powerful than now exist) it would be illusionary to speculate on the extension of their efficacy to types of cancer different from those which we now know how to affect. One may be able to increase the proportion of cures among radiocurable neoplasms, but the constraint of the difference between the radiosensitivity of normal and pathological tissues, leading, in the case of resistant cancer, either to radionecrosis or recurrence, will persist unchanged if other conditions remain the same.

The solution of the above problem, the conditions of which we have fixed, seems thus to be as follows. From the therapeutic point of view, radium could completely replace x-rays in the radiotherapy of cancer; from the same point of view, x-rays could take a place exclusively in teleradiotherapy. Practically, even when we take into consideration the services which the new apparatus of roentgentherapy at a short distance (contact-therapy) may render, the small curietherapy foci in the form of tubes, moulage, needles, etc. made for superficial intracavitary or interstitial applications, seem destined to endure as long as the radiotherapy of cancer itself. They will persist moreover as an indispensable arsenal because of a varied action, at the same time very powerful and very localized, which they alone can exercise.

PATHOLOGICAL AND IMMUNOLOGICAL STUDIES IN POLIOMYELITIS*

BY MAURICE BRODIE, M.Sc., M.D.

Pathology Laboratory, Providence Hospital, Detroit, Mich.

A CONSIDERABLE amount of work has been carried out in the past few years in poliomyelitis towards the elucidation of the portal of entry and route of transmission of the virus, and upon the significance of the so-called antibody or neutralizing substance. These studies have increased our understanding of the disease, and thrown open to doubt previous concepts of treatment and prevention.

In order to clarify and evaluate the experimental data herewith described I wish to make a few remarks about experimental poliomyelitis. The disease agent, a filterable virus, cannot grow upon non-living media as do bacteria. It has a narrow range of host susceptibility, the central nervous system of man and certain monkeys, where it multiplies and produces lesions. The experimental animal of choice is the *Macacus rhesus* monkey. The spread or multiplication of the virus can be demonstrated by inoculation into the monkey, whereupon the animal develops fever, cerebrospinal fluid pleocytosis, and flaccid paralysis. The histo-pathological picture of the brain stem and spinal cord show neuronophagia, with perivascular and interstitial infiltration. The spinal cord of such an animal can, upon suitable inoculation, produce the disease in another animal.

The neutralizing substance, or so-called antibody, is present in the blood serum of certain normal persons, especially adults, and also in

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Medicine, June 24, 1937.

the serum of some convalescent human beings and monkeys. A serum which contains neutralizing substance renders virus non-infective, so that the incubated mixture fails to infect monkeys. The virus used in this and many other laboratories has been passed through monkeys for many years, and so is highly virulent for these animals. From time to time new strains obtained from spinal cords or nasal secretions are transferred to monkeys. It is from the blood or tissues other than the central nervous system.[1] In our own laboratory we tested the blood of intranasally infected monkeys in the incubation period of the disease, in the pre-paralytic, and late stages of the disease, and were unable to demonstrate virus.[2] Moreover, animals sacrificed in the pre-paralytic stage of the disease failed to show the presence of virus in the liver, spleen, lymph glands, kidneys, salivary glands or muscles.[2] Also,

TABLE I.

Monkey number	*Clinical course*	*Intra-cerebral*	*Re-inoculation*	*Neutral*	*Tests*
		Time after onset	*Result*	*Time after onset*	*Result*
J 207	Arms and legs weak; later legs paralyzed; residual paralysis.	3 weeks	Resistant	2 weeks	— –*
				8 "	– –
J 64	Legs paralyzed; arms weak; residual paralysis in all limbs.	6 "	"	6 "	— –
R 62	Legs paralyzed; arms weak; residual in legs.	6 "	"	6 "	+**
J 230	Weakness in arms; ataxia; complete recovery.	8 "	"	3 months	+
69	Right leg paralyzed; other limbs weak; residual paralysis in legs.	6 months	"	7 "	–
V 8	Left leg paralyzed; other limbs weak; residual, all limbs.	7 "	"	8 "	+
B 79	Arms paralyzed; one leg paralyzed; residual, one leg.	10 "	"	7 "	–
T 6	Left arm paralyzed; legs weak, complete recovery.	8 "	"	9 "	–

*Serum failed to neutralize.
**Serum neutralized.

essential to know whether such strains are related to, or differ immunologically from, the standard virus. This is done by testing with the new strains sera known to have neutralizing bodies for the passage virus and animals that have recovered from it. Likewise, animals recovered from the new virus and their sera are tested against the passage strain.

THE PATHOGENESIS OF THE DISEASE IN THE MACACUS RHESUS MONKEY

The essential lesions of experimental poliomyelitis occur in the cord and brain-stem, and they closely resemble the human findings. There has been considerable controversy regarding the route of transmission, and the pathogenesis has only been established in the past few years. Despite the systemic symptoms which may occur prior to the central nervous system symptoms one can readily rule out a primary hæmatogenous or lymphogenous spread. The virus has rarely been isolated in keeping with the findings of others, we failed to show significant lesions outside the central nervous system in more than 50 monkeys killed in the acute stage of the disease.

The transmission of the virus through the central nervous system is not by way of the spinal fluid, for it is rarely found there. We were unable to demonstrate the presence of the virus in spinal fluid removed in the incubation period in the pre-paralytic or paralytic stages of intranasally infected monkeys.[2] The work of several investigators has indicated that the cellular exudate in the cerebrospinal fluid is the result of an overflow from the nervous tissue by way of the perivascular spaces. In keeping with this is the fact that symptoms may occur in the animal prior to the pleocytosis, or may even be absent throughout the course of the disease.[3]

The idea of transmission by nerve tracts, first suggested by Liener and Wiesner and Römer, has received considerable support from Hurst

and co-workers in England and Faber and ourselves in this country. Fairbrother and Hurst[4] traced the virus from such sites of inoculation as the brain and sciatic nerve by following the sequence of the histo-pathological changes and distribution of the virus at various stages of the disease, and concluded that it travelled by way of the nerve tracts. After intra-nasal instillation of virus, lesions and virus are first found in the olfactory bulbs,[5] and follow in a general way the olfactory apparatus.[4] We,[6] as well as Schultze and Gebhardt, have been able to prevent infection *via* the nasal route by sectioning the olfactory nerves. Likewise, we were unable to infect by inoculating below the line of cleavage of a sciatic nerve whose peri-neural sheath had been sutured. In keeping with these findings Jungeblut and Spring reported that after intra-cerebral inoculation into an animal with severed spinal cord the virus failed to reach the lower segment. We have found that in animals with cut spinal cords, and in which a free flow of cerebrospinal fluid was demonstrated, the virus failed to pass the gap when inoculated into either the upper or lower segment. Similar findings were obtained with both passage virus and two recently isolated strains. These experiments also help to rule out either hæmatogenous or lymphogenous spread of the virus, for the blood supply was intact to both upper and lower segments of the cerebrospinal axis.

If the virus travels along the nerve tracts one would expect its primary effects upon the neurones. This is borne out by histo-pathological studies and by the fact that the amount of nerve cell destruction in the various areas of the cerebrospinal axis is correlated with the quantity of virus present. It appears, therefore, that in experimental poliomyelitis injury and death of nerve cells is the outstanding lesion, and that the exudate is merely secondary.

One cannot always interpret the human disease in the light of the results obtained in experimental animals. In yellow fever, for example, the virus produces a generalized disease in human beings and in monkeys, while in the mouse the disease is decidedly neurotropic. The manifestations of some other viruses also vary with the host.

The portal of entry in the human has been and still is the subject of considerable controversy. In the experimental animal the virus has definite predisposition for the olfactory nerve, but we shall consider only those studies which deal directly with the human subject.

Evidence to favour the nasopharynx as the portal of entry is as follows. (1) The epidemiology of the disease resembles in many respects a droplet disease. (2) The onset of the disease is often accompanied by upper respiratory symptoms. (3) The virus has been isolated from the mucosa and naso-pharyngeal washings of acute cases, from the nasal excretions of normal and convalescent carriers, abortive and non-paralyzed cases. (4) Rarely has the virus been isolated from the gastro-intestinal contents or its mucosa. The gastro-intestinal tract as a portal of entry has received considerable attention recently by Kling and his co-workers in Europe and Toomey in this country. They have pointed out certain epidemiological aspects of the disease whereby it resembles a gastro-intestinal infection, and have also stressed the gastro-intestinal symptoms that often accompany the onset. Harmon[7] reported recently that he was unable to find the virus of poliomyelitis in the nasopharangeal washings of 20 cases, yet he claimed to have been able to demonstrate its presence in the fæces of 5 of them. He also failed to demonstrate lesions in the olfactory bulbs of 9 fatal cases. The details of these rather significant experiments have not as yet been published. Landon and Smith[8] recorded lesions of the olfactory bulbs in only 25 per cent of a series of 56 cases which they examined. These conflicting data on the epidemiology and on the isolation of virus from the human body should make one consider the possibility of both portals of entry, especially as some epidemics start with nasal and others with gastro-intestinal symptoms. It is true that the evidence greatly favours the naso-pharynx as the portal of entry.

Direct evidence upon the route of transmission, based upon studies in the human subject, is rather meagre. The idea of a general dissemination, either lymphogenous or hæmatogenous, is based on the systemic manifestations of the disease frequently present prior to central nervous system symptoms. Medin stressed the pre-paralytic symptoms and described the so-called "dromedary" or diphasic type of the disease. Many pathologists have stressed the

histo-pathological lesions found outside of the central nervous system. Rissler being one of the first and recently Smith[8] has stressed their importance.

On the other hand there are those who believe that the generalized symptoms can be explained entirely upon a central origin. The virus in travelling through the central nervous system can strike the temperature and vasomotor centres in the hypothalamus, causing fever, gastro-intestinal or upper respiratory symptoms, and other symptoms evident in early poliomyelitis. If in monkeys, where the disease is entirely neurotropic, one can have a systemic phase of the disease and even diphasic attacks,[3] the same should be possible in the human being.

Likewise, some believe that the lesions outside of the central nervous system are inconsequential, like those of any acute infectious disease. They may not indicate a proliferation of the virus in these organs. Our own studies of 7 cases were in accord with this belief, for we found but slight changes in the spleen, lymph glands and thymus.

Attempts to obtain the virus from the blood stream have been negative. Likewise, the virus has been isolated in organs other than the central nervous system but once,[1] although the number of attempts have been relatively few. In our laboratory different tissues, including the liver, spleen, kidney, lungs, submaxillary glands, mesenteric lymph nodes and muscle from three cases were tested for the presence of virus. Large quantities of these tissues failed to produce poliomyelitis in monkeys, although infections were obtained with relatively small amounts of cord tissue from these cases.

It is hardly likely that the virus is carried by the cerebrospinal fluid, for our own attempts and those of others have failed to reveal the presence of virus in it. Moreover, the pleocytosis may occur after the onset of nervous symptoms, or be absent, suggesting that the cells enter the subarachnoid space from the cord. The increase in protein sometimes occurs after the pleocytosis; this would be hardly likely if the meninges were involved earlier than the cord. Therefore, axonal transmission and primary involvement of the neurones, the latter suggested by Charcot and Joffrey 65 years ago, must be considered, but this view is in need of further proof.

THE PRESENCE OF NEUTRALIZING BODIES AND RESISTANCE TO THE DISEASE ARE NOT NECESSARILY CORRELATED

Immunological studies.—When the virus of poliomyelitis is inoculated into a susceptible host two changes can occur. One is a resistance against reinfection, the other, the development of the so-called neutralizing substance. It was thought until recently that these were associated. As has been recently pointed out by Schultz and Gebhardt and Olitsky and Cox,[9] we have found that animals inoculated by the skin route with active or modified virus may develop neutralizing substances and yet fail to resist intra-cerebral inoculation of the virus. Likewise, Jungleblut[10] and Sabin and Olitsky[11] have shown that recovered monkeys may resist reinfection at the time when they possess no serum neutralizing substances. Upon extending these studies, it was found that the serum of only 3 out of 8 convalescent monkeys which were resistant to reinoculation neutralized the virus although tested as long as 8 to 9 months after the onset of the disease (Table I). Likewise a number of investigators have shown that the sera of convalescent patients may fail to neutralize the virus. Recently we carried out an extensive study upon convalescent sera obtained from children admitted to the Willard Parker Hospital during the New York City outbreak in 1935.[12] The sera of a large group of children, both paralytics and non-paralytics, were tested upon admission, that is, within a few days of the onset of the disease. A number of those who failed to neutralize the virus were retested at short intervals up to 8 or 9 months after the onset. The composite results, given in Table II, indicate that the majority of these children

TABLE II.

Summary of neutralization tests during first year of convalescence of persons whose sera failed to neutralize in the first week.

	Paralytic		*Non-paralytic*	
Age groups years	*Number tested*	*Number neutralized*	*Number tested*	*Number neutralized*
1-5.....	16	1	2	0
6-10.....	14	0	6	0
11-17.....	6	1	3	0
Adult.....	3	0	0	0
Total...	39	2	11	0

failed to develop neutralizing substances in their sera. Moreover, 14 out of 82 paralytics had neutralizing substances in the first few days of illness and 2 of these in the pre-paralytic stage. Harmon and Harkins also reported the presence of antibody in the serum of a patient tested in the pre-paralytic stage. One might say that these 14 individuals responded to the virus with antibody formation, very quickly. I wish to remind you, on the other hand, that of 39 who lacked antibody upon admission but 2 developed it within some months after the onset. This leads me to believe that poliomyelitis can develop in the presence of neutralizing substances.

Antibody is probably an indication of immunity.—From these data one may well inquire as to whether the presence of neutralizing substance is any indication of immunity or resistance to infection. Up to the present time there is no such evidence in the experimental animal. This may be due to the fact that the level of neutralizing substance is not sufficiently high, or else, because the virus is neutrotropic and antibody cannot reach it. In the case of human beings there is evidence to believe that neutralizing substances correspond to some extent with immunity. The incidence of the presence of neutralizing substance is at the onset of the disease decidedly higher in non-paralytics than in paralytics (Table III). There is even more evidence in the case of persons over the age of ten, of whom more than 50 per cent show neutralizing substances, very much like the so-called normals (Table III). This decidedly smaller proportion of paralytics, especially over the age of ten, who possess antibody as compared to non-paralytics or normals suggests that the neutralizing substances help to limit or prevent infection.

The specificity of the neutralizing substances.—Do the above inconsistencies between the presence of neutralizing substances and resistance disprove the idea that the former is a specific response to the virus? In other words, does the resistance arise only from exposure to the virus or can it result from other factors as developmental changes such as Jungleblut and Engle have suggested? It might even result from exposure or reaction to a related antigen. There are certain factors in the epidemiology of the disease on account of which it is difficult to explain the presence of neutralizing substances in adults on the basis of subclinical immunization.[1] Moreover the antibody is present in the sera of individuals who reside where poliomyelitis is almost absent.[1] On the other hand, the distribution of the neutralizing substances in the sera of both urban and rural residents follows the trend of the Schick test, and in diphtheria this immunity is well founded upon exposure.[1] It is absent from the sera of monkeys where the likelihood of exposure to the virus is remote. We have been unable to demonstrate neutralizing substance in the sera of monkeys of different ages, nor were they resistant to inoculation. Moreover, the failure to develop neutralizing substance in convalescents does not detract from the idea of the specificity of the antibody. One can scarcely assign the inability of these affected with poliomyelitis to a general constitutional defect in view of the fact that so many monkeys may fail to show its presence in convalescence. Likewise, it does not seem to be an inhibition of antibody formation for neurotropic viruses. To this end the sera of ten convalescents, some known to have poliomyelitis antibody and some that lacked it were tested against a neurotropic herpes virus. There

TABLE III.

Summary of neutralization tests with sera taken in the first week of the disease and from normals.

	Paralytics			*Non-paralytics*			*Normals*		
Age group in years	*Number tested*	*Sera neutralized*	*Sera failed to neutralize*	*Number tested*	*Sera neutralized*	*Sera failed to neutralize*	*Number tested*	*Sera neutralized*	*Sera failed to neutralize*
1-5.....	26	2	24	6	1	5	96	5	91
6-10.....	25	4	21	14	10	4	38	11	27
11-17.....	19	4	15	10	5	5	25	19	6
Adults....	12	4	8	2	2	0	13	7	6
Totals..	82	14	68	32	18	14	172	42	130

was no correlation, and convalescents who failed to develop poliomyelitis-neutralizing substances showed herpes antibodies. In other virus diseases antibody may be absent in convalescence, and so its absence in poliomyelitis convalescents should not appear unusual. Its presence or absence may depend upon the amount of virus that leaves the central nervous system to reach the antibody depots. The occasional development of antibody more than a year after the onset may be the result of hyperimmunization.[12] A very strong argument in favour of the specificity of the antibody is the fact that it has been produced experimentally only after exposure to the virus.

THE TREATMENT OF POLIOMYELITIS

Prior to 1931 serum was generally recommended in the treatment of pre-paralytic poliomyelitis, despite the lack of statistically controlled data to prove its worth. As a result of two separate controlled studies carried out during 1931 in which alternate cases without paralysis were treated with serum, the mortality and paralysis rates were approximately the same for the treated and untreated cases. In the experimental animal, where the disease is entirely neurotropic so that the virus contained in the central nervous system is walled off from the blood system by the Virchow-Robin spaces, extremely large doses of tested serum of high neutralizing power failed to affect the course of the disease. Serum or whole blood in 75 to 300 c.c. amounts was given intravenously at the onset of symptoms, and in one instance during the incubation period.

Should human poliomyelitis prove to be a systemic disease with secondary localization in the central nervous system can better results be obtained with larger amounts of more potent serum? This question may well be asked, since untested convalescent serum was used in the 1931 outbreak, and so many of the specimens making up the pools of sera probably lacked neutralizing antibodies. However, the diagnosis of poliomyelities cannot be made until meningeal manifestations are apparent and then the central nervous system is already involved. At best the serum could only prevent more virus from entering the central nervous system. Little of it can pierce the blood central nervous system barrier, any more than can salvarsan. Any that pierced the barrier, broken down through inflammation, would be ineffective in preventing further spread of the virus, for a virus that is already fixed to cells can grow in the presence of its own antibody.

Various non-specific treatments have been advocated and tried. Amongst these are repeated lumbar puncture or spinal drainage. It seems hardly likely that the increased flow of spinal fluid can wash out the virus that is already fixed to the nerve cells. Adrenalin, ephedrine and hypertonic solutions have been used to relieve the œdema and congestion of the central nervous system, but without definite results. These measures may be of value in bulbar cases, to relieve temporarily pressure upon the vital centres.

PREVENTION

Active immunization.—Because of the belief prevalent until recently that neutralizing substances were indicative of immunity to poliomyelitis a considerable amount of the active immunity work in monkeys was gauged by the antibody response. Neutralizing substances have been produced in monkeys by skin-inoculation of active virus,[1] attenuated,[1] or germicidally treated, non-infective virus.[11, 15] I have also reported[15] that some animals which had received formalized virus were also resistant to intracerebral inoculation of virus. Other workers have failed to confirm this finding. Whereas I used for the test dose what approximated a minimal infective dose of virus, these experimenters injected a stronger dose. The reliability of such small doses has been questioned.[16] Further investigation upon this subject leads me to believe that it is unwise to use such small doses of virus to test animals.

Both the ricinoleated virus used by Kolmer[17] and the formolized virus used by ourselves produced neutralizing substances in children. Children whose serum failed to neutralize in the control period appeared to respond better than did monkeys. Aycock and Hudson[18] and Kramer found that children in an epidemic area developed antibody within several months. The former tested sera from a group of children from an epidemic focus during the 1935 North Carolina outbreak who had received formalized vaccine, and compared the findings with those in a group of non-vaccinated chil-

dren. The tests carried out just before vaccination and sera were again obtained approximately 2 months after the first dose of vaccine. Of those whose serum failed to neutralize in the first test, 10 of 19 vaccinated and 9 of 31 controls had developed neutralizing bodies.

The children whom we tested were in an area free of known cases of poliomyelitis, and the tests were carried out within three to four weeks after the administration of the vaccine. It seems likely, therefore, that the antibody response was due to the vaccine. Altogether, 10,000 children received formolized virus, but the number was too small to give information as to the value of the vaccine from a comparison of the incidence of the disease in the vaccinated individuals and the controls. A report by the Kern County Health authorities,[19] who vaccinated nearly 4,000 persons in an epidemic area, concluded as follows: "Although the results are not statistically conclusive, they strongly suggest an actual immunizing effect from the Brodie vaccine."

The probability of obtaining an effective vaccine will depend upon several factors. In the first place should the human disease prove to be neurotropic, as in the monkey, it will be difficult and perhaps impossible to develop a safe and effective vaccine. If, on the other hand, the human disease proves to be systemic, then by analogy with other diseases a non-infective vaccine may produce immunity.

The measure of a person's reaction to the vaccine will be the presence of neutralizing substances. It will be necessary therefore to carry out further work with a view of determining the relationship of the presence of antibody to resistance to the disease. It will also be necessary to determine whether or not susceptible persons are capable of producing neutralizing substances. The need for a susceptibility test is quite obvious.

The practical application of a vaccine will be in a large measure determined by whether single or multiple strains exist. If multiple strains that are unrelated immunologically exist, it will be hardly feasible to prepare a polyvalent vaccine. Until recently the evidence has been that differences in strains were quantitative, that is the results of differences in virulence. Recently, several investigators have reported that qualitative changes exist. In our studies upon three strains we found that one was almost identical with the passage strain and that the other two differed qualitatively. One must bear in mind the possibility of only one strain existing in the human being but that virus specimens can be modified in passage through the monkey. There is evidence of this in other virus diseases. The few secondary cases of poliomyelitis that have been reported speak against multiple strains.

Nasal sprays as a method of prevention.—Tannic acid, alum, zinc sulphate[20] and other astringents applied to the nasal mucosa protect monkeys against the intranasal instillation of virus. Although the exact mechanism by which these substances can protect monkeys from intranasal infection is not definitely known it is believed that they protect the olfactory nerves from the virus. The method was applied to human beings in the summer of 1936 in Alabama by Armstrong of the United States Public Health Service,[21] but the results were not encouraging. Armstrong felt that the failure was attributable in part to improper application of the spray.

On the other hand there are other reasons which speak against the probable success of nasal sprays as a means of prevention in children, although they protect monkeys against nasal infection. In the first place, due to frequent blowing and picking of the nose and other forms of trauma to the mucosa of children, the applications may not last sufficiently long to serve as a successful barrier. In addition the irritation produced may weaken the olfactory barrier if the virus travels along the olfactory nerve. Secondly, the spray can be administered to young children only with difficulty and not always satisfactorily. Even more important is the possibility that the virus does not travel along the olfactory nerves. It would seem more logical therefore, to elucidate the path of the virus and let the future use of nasal sprays be guided by the results.

CONCLUSIONS

1. The virus of poliomyelitis in the experimental animal is strictly neurotropic and travels by way of the nerve tracts.

2. Neither the route of transmission nor the pathogenesis has been finally determined in the human subject. Therefore one cannot draw too close an analogy between the experimental and human diseases, nor apply all experimental results that bear upon the route of transmission and pathogenesis to the human being.

3. The immunological data were studied, from which the following conclusions can be stated: (*a*) The presence of serum-neutralizing substances or the so-called antibodies, and resistance to the disease are not necessarily correlated. However, in the human subject there is evidence to believe that the presence of antibody may be indicative of immunity. (*b*) Recovery from poliomyelitis does not as a rule, result in demonstrable antibodies or neutralizing substances. (*c*) The so-called neutralizing substance can develop only as a result of specific exposure to the virus. (*d*) There is evidence to believe that more than one strain of virus exists.

4. Neither convalescent serum nor any of the other available measures of treatment that have been advocated offer any hope for the prevention or limitation of paralysis in treated case.

5. The value of active immunity as a preventive is undetermined. Further studies should be withheld until the human pathogenesis has been worked out, and further immunology, especially upon the question of strains.

6. Nasal sprays are effective in protecting the monkey. In the human being the results are not encouraging, and the reasons are discussed for believing that they will not protect.

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PRE-ECLAMPSIA*

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PRE-ECLAMPSIA is the name applied to a group of signs and symptoms which we usually believe to have been brought about by the presence of a toxin within the mother. It has been termed pre-eclampsia because the clinical and laboratory features are so closely allied to eclampsia. The common belief is that pre-eclampsia is frequently the forerunner of eclampsia, or that eclampsia is often the result of an untreated pre-eclampsia. It seems that we must be content at present to accept this seemingly intimate relationship between pre-eclampsia and eclampsia until we have proved it otherwise. We could of course designate all such toxæmias as eclampsia, and then divide eclampsia into the mild, moderate and severe forms. However the term pre-eclampsia serves the same purpose, and it is a term which has been in such common use for so long that we are loath to discard it until we have a good reason for doing so. Pre-eclampsia is synony-

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mous with the term *eclampsisme*, used by certain European writers.

The etiology of pre-eclampsia is still unknown. I believe that most of the clinical manifestations of the disease are end-results; seemingly, none of these have acted as causative agents. The gain in body weight, the rise in systolic blood pressure, the renal changes, and the changes in liver function are apparently products of a cause, but the pathological changes found in various organs of the body have not yet led us to that cause.

Some of the factors which have been receiving serious consideration within a recent date may be briefly reviewed. There are three possible sources, the baby, the mother and the placenta. We have no specific evidence that the cause is to be found in the baby. We know that a grave form of toxæmia may be found in association with a vesicular mole, in which there is no fetus. Chemical observation of the maternal blood and urine goes to show that there is no accumulation of waste products. A certain amount of evidence has accumulated which goes to show that the toxæmia arises within the mother. Certain of these theories might now be reviewed.

Cary[1] claims that on a free protein diet a putrefactive type of bacteria is developed, which is capable of splitting the mucus found in the large intestine into a toxic substance. This toxic substance acts as the cause of pre-eclampsia. Hofbauer[2] in 1918 held that there was an excess of the pituitary diuretic substance in the mother's blood during pregnancy, and that this was the cause of eclampsia or pre-eclampsia. C. Wilson and F. B. Byron[3] in 1934, after quite extensive work, concluded that there was not an excess of the pituitary diuretic substance in the blood of pre-eclamptic patients. Paramore[4] believes that pre-eclampsia and eclampsia result from the increased intra-abdominal pressure as the uterus enlarges during pregnancy. The mechanical pressure of the uterus interferes with the normal capillary circulation in the liver, and finally interferes with normal liver function. Several students of the subject believe that pre-eclampsia is the result of a disturbance in protein metabolism. They maintain that certain end-products of protein metabolism fail to be completely broken down, resulting in an accumulation of rest nitrogen guanidine or a similar substance, which is believed to be the cause. A disturbance in the endocrine balance in the body is said by some to be the cause. Hofbauer[5] believed that pituitary dysfunction was the cause. Shute,[6] in our School, believes that an excess of œstrin or œstrogenic substances within the mother may be the cause of pre-eclampsia or eclampsia, by bringing about placental detachment along with moderate degrees of hæmorrhage. Hypercholesterolæmia is believed by Bartholomew and Kracke[7] to be the cause of this form of toxæmia. They state that the normal blood cholesterol is raised from 125 mg. per cent in the non-pregnant woman to 200 mg. per cent during pregnancy. This excess of cholesterol tends to be deposited in the intima of the smaller blood vessels. In time the lumen of the vessels is more or less occluded, leading to areas of infarction. The toxic substance is then derived from the impacted areas.

Considerable evidence has at the same time accumulated in favour of the toxin arising from the placenta. Prof. James Young,[8] of the Post-graduate School, London, claims that a placental cotyledon becomes separated from the uterine wall owing to hæmorrhage or some other interference with the maternal blood supply. Massive necrosis of the separated cotyledon follows. He found red infarcts in the eclamptic placenta. Such a mass of necrotic tissue may become the source of toxic autolytic bodies capable of producing eclampsia or other pregnancy toxæmias. Schmorl[9] believes that portions of chorionic villi break off into the mother's blood stream. The autolysis of this epithelial tissue produces certain toxins which cause pre-eclampsia and eclampsia.

Dryfus[10] thinks that the activity of the intracellular ferments of the placenta are increased in eclampsia, and he also claims that autolysis takes place in the placenta before it is shed, in which case toxic products of protein autolysis are produced and act as the cause of pre-eclampsia.

Thus we may conclude that there is no common ground upon which the workers all meet. There are however in some of them certain relationships. One such relationship is the finding of Professor Young who claims that the origin is from an infarcted area in the placenta. He does not offer us a reason for the infarction.

Shute in our school, claims that the infarction is due to an excess of œstrin within the mother. Or again the impaction may be due to a hypercholesterolæmia, as claimed by Bartholomew and Kracke.

The laboratory findings of pre-eclampsia vary somewhat, but certain of the more consistent ones may here be cited. According to Sullivan, Tew and Watson[11] the liver function test is the most sensitive. The rate of the disappearance from the blood of the bile pigment is an index of the functional capacity of the liver. Berkeley, Dodds and Walker[12] believe that the liver function is the best guide in the prognosis of toxæmia and for the termination of the pregnancy. They also feel that too much reliance must not be placed on liver function tests. Cross[13] states that all liver function tests should be interpreted with caution.

Pregnancy may at times bring to light hitherto unsuspected renal damage.

Starling and Verney[14] believe it is possible that the sodium chloride and water secretion by the kidney is controlled by an anti-diuretic pituitary hormone. Where this comes from we do not know. The kidney tests which are of value in the toxæmias of pregnancy are the urea-concentration test, and the specific gravity volume test. These tests reveal with some degree of accuracy the ability of the kidney to function within normal limits or otherwise. Such tests are of assistance in giving a prognosis. They are tests of end-results of a disease and not tests for causative agents.

Blood chemistry.—Much work has been done on the chemical investigation of the blood and urine in pre-eclampsia. So far it has failed to throw light upon the nature of the toxæmia. Recent work has proved that a high ammonia co-efficient and other alterations in the nitrogen partition of the urine are not of special significance. Mild alterations are normal in pregnancy, while the extreme changes are due to other factors incidental to the toxæmia. It seems therefore that, as far as one can see at present, there are no changes in the blood chemistry which are characteristic of pre-eclampsia or eclampsia.

Pathological anatomy.—Accurate information concerning the pathological anatomy of the various organs affected is rather meagre. This is of course due to the fact that most cases of pre-eclampsia get better when treated early. The pathological findings which we are fairly clear about are those of actual eclampsia. Since, however, pre-eclampsia is believed to be a forerunner of eclampsia one could assume that the difference in the pathological changes in the two would be chiefly in degree. The pathological findings in eclampsia are not consistent, but the common findings are general œdema with hæmorrhage. The organs involved are usually the liver, kidneys, brain and heart. The findings suggest the presence of a toxin or something which produces similar pathological changes.

CLINICAL FEATURES

The clinical features of pre-eclampsia are well known to us all. Some workers claim that pre-eclampsia is uncommon and only constitutes from 5 to 8 per cent of all toxæmia patients. Others claim they make up over 25 per cent. The difference of opinion is due to a difference in diagnosis. Some of the pre-eclampsias may be classed under low-reserve kidney and hypertension or vice versa. My own view is that pre-eclampsia is the most common of all the toxæmias of late pregnancy. I have not found low-reserve kidney or hypertension to be nearly so common.

Pre-eclampsia is more common in primiparous patients, and usually develops during the last third of pregnancy. The systolic blood pressure is usually higher than in low-reserve kidney, but lower than in cases of hypertension. The diastolic reading is proportionally high. The albumin is greater than in low-reserve kidney and is usually greater than in cases of hypertension. Visual disturbances are fairly common. The ophthalmoscope may or may not reveal small hæmorrhages in the retina in pre-eclampsia, while in hypertension cases one usually finds evidence of old retinal hæmorrhages. There is a feeling of lassitude in pre-eclampsia of recent onset. There is not commonly any history of previous kidney trouble in pre-eclampsia, while in low-reserve kidney and hypertension one may get such a history. The urine of the pre-eclamptic may also contain casts.

An abnormal gain in body weight is one of the early signs of pre-eclampsia. According to Harding and Van Wyck[15] a gain of between

5 and 8 pounds is evidence of pre-eclampsia, or at least of water retention. I find this is one of the most reliable signs of pre-eclampsia.

An elevation in the systolic blood pressure is a fairly constant warning of pre-eclampsia. I usually consider this if the rise is over 130. According to Brown the systolic blood pressure is a more reliable guide than the diastolic. I agree. If the blood pressure is up to 140 systolic the patient should be started on pre-eclamptic management.

Œdema, either visible or occult, is another early sign. There is usually some œdema of the extremities. At the same time there is quite likely some œdema of the viscera, if one could demonstrate its presence. We do have reasonably good evidence of visceral œdema in many of the cases, however, such as headache resulting from cerebral œdema, and persistent moisture in the lung bases. All of these facts of course signify that the patient is becoming waterlogged.

The signs and symptoms of pre-eclampsia in order of their clinical significance are: (1) an abnormal gain in body weight (5 to 8 lbs. a month); (2) elevation of the systolic blood pressure over 135 for the average patient; (3) œdema, either visible or occult; (4) urinary changes, such as albumin in the urine, diminished output, possibly casts; (5) lassitude and headache.

TREATMENT

The management of the pre-eclamptic patient is somewhat as follows. She should preferably be at rest in bed until the condition is under control. Rest plays an important part in the treatment; I think it is the most important single factor. The next point is the diet. This should be salt-free until under control, and then I allow a little salt in the cooking, gradually working up the patient's tolerance. The question of protein is guided by the degree of kidney damage. If albumin is present with casts I would make the diet protein-free for a few days and then add protein, beginning with 50 g. a day and gradually increasing up to 75 or 100 g. as the patient improves. Allow her up to 450 to 500 g. of carbohydrate a day and 50 g. of fat. Give an alkaline mixture and Epsom salts as well. As she improves you may allow her up, but curtail her activities and insist on daily rest. Such a patient must of course be kept under fairly close observation from then on. Most of them can be guided along reasonably close to term and to full term. A certain percentage will require induction of labour a little before full term. These are the patients who are still somewhat toxic, and cannot be satisfactorily controlled, even with good management. I feel that with the very questionable toxic patient it is far better to do a medical induction a week or two before full term than to run the risk of losing the baby and at the same time endanger the mother's chances.

Prognosis.—The immediate outlook for the pre-eclamptic is quite good, providing she is treated early and properly. The ultimate outlook should be quite good. Such a mother may have several other pregnancies without showing a sign of pre-eclamptic toxæmia.

SUMMARY

1. A general review of the subject of pre-eclampsia has been attempted.

2. Pre-eclampsia is the term used to signify a pathological condition in the mother closely akin to eclampsia. There is no reason for dropping the term pre-eclampsia until we have a much better one. This will probably not come until we really know the etiology of pre-eclampsia and eclampsia.

3. There are evidently no constant or consistent findings in pre-eclampsia, except visceral œdema, small areas of hæmorrhage, and occasional areas of necrosis.

4. There are no characteristic changes in the blood chemistry of the pre-eclamptic patient.

5. The pathological results appear usually in the final third of pregnancy, during the period when the placenta is undergoing senile changes. Is there any relationship?

6. The exact cause of pre-eclampsia is unknown. Recent work directs our attention particularly to the placenta or some relationship between the placenta and the endocrines as the source of the trouble. The fact that the placenta begins to be senile in the seventh month may bring about a disturbance between certain body hormones and the placenta. In other words, the senile placenta may disturb the normal balance of the pregnancy hormone which was

maintained properly so long as the placenta was a youthful adult organ.

7. The clinical manifestations and management of pre-eclampsia have been outlined in the order of their importance.

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GERMAN MEASLES OR RUBELLA*

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GERMAN measles is a mild, insignificant disease, but when it occurs in a widespread epidemic it causes serious inconvenience and disruption of various social activities in a community.

In the winter of 1935-36 the greater part of Quebec and Ontario was visited by such an outbreak of German measles as was almost unprecedented. The epidemic occurred the previous spring in New York and other parts of the New England States, and spread northward. In Canada the outbreak apparently centred in Montreal, where it caused what was probably the second most widespread epidemic in the history of the city, the only more extensive one being the epidemic of influenza in 1918. How many persons in Montreal were affected it is impossible to say, as the disease was so mild that most of the cases were never seen by a doctor and were not recorded. The City Health Authorities admitted 15,000 cases recorded, but the total number must have been in the vicinity of 100,000. All parts of the city were affected and all classes of people. As might be expected, the schools, colleges and hospitals suffered most. Many schools reported 40 per cent of scholars and teachers affected. McGill University estimated that 20 per cent of the students were affected. The hospital work was seriously handicapped; *e.g.*, in the Children's Memorial Hospital 33 per cent of the nurses had the disease. This widespread outbreak gave unusual opportunities for observing the disease, and the following remarks may be of interest.

Second attacks of the disease are very rare, hence the usual occurrence of a general outbreak in a community is only about once in a generation. It is nearly twenty years since we had a marked epidemic of German measles in Montreal. Children were chiefly affected, but the disease was quite common in young adults, and occasional typical cases occurred even in elderly people.

When the incubation could be traced, it appeared to be always between 2 and 3 weeks, in the vast majority of cases just 17 days. This long incubation probably accounted for the long duration of the outbreak, which began in November, 1935, culminated in March, 1936, and only ended in May, 1936, about six months in all, as contrasted with influenza outbreaks which usually last 6 to 8 weeks only.

As to the infection, it is generally agreed that the disease is due to a filterable virus, and its mode of infection is very similar to that of measles and chicken-pox. The infection was almost exclusively by direct contact with patients, the many mild unrecognized cases ruining any efforts at control by quarantine. It is apparently difficult to convey it through a third person, and the con lition of true chronic carriers

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appears to be unknown. The disease is apparently most infectious in the pre-eruptive stage and there is no evidence of infection after the eruption fades and the swelling of the glands subsides. This point should be emphasized, as the infective period is probably never more than 5 days in all and the insistence on two or three weeks' quarantine of patients is absurd.

As to the course and manifestations of the disease, the swelling of certain of the posterior cervical glands was the earliest and most characteristic sign. Usually only 2 to 4 glands were involved and these differed in position. The glands were usually tender and painful and often led to complaint of stiffness of the neck. The adenitis was often present 1 or 2 days before the appearance of the rash.

The fever varied greatly, was often almost absent, occasionally quite high, especially in cases seen at the peak of the epidemic when the infection appeared most virulent. The febrile period rarely exceeded 3 days in all.

The exanthem or rash was of course the most characteristic sign. It was easily recognized when the cases were numerous, and attention to details readily distinguished it from the eruptions of true measles and of scarlet fever. The eruption varied greatly in intensity, occasionally was even hæmorrhagic. Although not noted in most textbooks, an enanthem occurred quite commonly on the mucous membrane of the mouth and throat, and was often confused with the Koplik spots of true measles. Inflamed eyes due to conjunctivitis were often found, especially in adults, and were apparently due to the eruption occurring in the conjunctiva. Stiff joints or arthritis, another rarely described phenomenon, occurred not infrequently. This usually occurred after the rash and was of short duration and not serious.

Complications were exceptional and rarely serious. Encephalitis, similar to that following real measles, was seen in several instances and was described in the New York outbreak of the previous year. Although alarming, often leading to convulsions or coma, it was of short duration and left no sequelæ. The commonest complications were otitis and pneumonia, but most of these cases were probably due to a coincident respiratory infection.

Epidemics in the wards devoted to cases of tuberculosis and of rheumatic fever did not seem to excite exacerbations of these diseases. There was no mortality, and the treatment was entirely symptomatic.

In conclusion, German measles impresses one rather as an unmitigated nuisance than a serious menace. If it were not for the eruption, the disease would be utterly negligible, as it is much less serious in course and sequelæ than the common cold. Having watched many hundreds of cases, one feels that our knowledge of the disease and its control is not advanced. One is impressed with the utter failure of quarantine and isolation to control the outbreak. This is apparently due to two factors. First, the innumerable unrecognized and unreported cases, and, second, the occurrence of infectivity before the eruption enables the diagnosis to be made. Under the circumstances the insistence on placarding the house, prolonged quarantine, and disinfection seems useless, and inflicting undue hardships on the families who are unfortunate enough to have recorded cases. The only redeeming feature seems to be that the population of Montreal and other centres in Eastern Canada is probably thoroughly immunized at present, and not likely to be bothered by the disease for some time.

EXOPHTHALMIC GOITRE IN CHILDREN.—I. Bram records a series of 128 cases of exophthalmic goitre in children below the age of 12. Although most commonly observed in adult life, *Graves's disease may occur at* almost any age. The sex factor is important; only eight cases in this series occurred in males. The exciting cause in children was often a focal or general infection, and in 50 per cent of the cases the teeth or tonsils were found to be infected. Enlargement of the thyroid and exophthalmos were present in every case, and tachycardia was well marked. In many cases the circulatory disturbances caused much concern, and nervousness and tremor were also exaggerated. Vomiting and diarrhœa were present in many cases. The basal metabolism was difficult to estimate accurately and generally of little value. Treatment should be conservative when possible. All infectious foci should be removed and the child given an ample low-protein diet. Prolonged rest in bed is essential, but the child must be kept contented and occupied. The author thinks that Lugol's solution may be harmful in many cases, and he states that an occasional case of simple goitre became exophthalmic in type when too much iodine was given. The drugs found most valuable were the quinine salts, eserine salicylate, and the barbiturates.—*Arch. Pediat.*, July, 1937, p. 419. Abs. in *Brit. M. J.*

HEAD INJURIES*

BY A. R. ELVIDGE

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CAREFUL management of cases of head injury is necessary if complications, immediate or remote, are to be avoided. Treatment depends upon the surgical emergency present as well as upon the type and severity of the intracranial lesion. It is important to make an immediate appraisal of the injury, for which a thorough general and neurological examination is obviously essential, including a short but pointed account of the case with sufficient past history to exclude such complicating factors as epilepsy, hypertension, alcoholism, diabetes and previous mental disease. For the purpose of discussion the subject of head injuries may be considered under the sub-headings of (1) scalp injuries; (2) skull injuries; (3) injuries to the brain and its coverings; (4) injuries involving the important spaces about the brain. In the present instance the subject is dealt with from the point of view of treatment.

Scalp lacerations. — One can hardly speak about head injuries without saying a word about scalp lacerations, however commonplace and unimportant they appear. I have practised rather radical débridement by excision of the whole of the lacerated edge and all damaged redundant tissue. The wound is cleansed with 5 per cent iodine solution which is at once neutralized by Dakin's irrigation. Contaminated instruments are discarded, and suturing is carried out with a clean set. Seldom, if ever, does one obtain infection in such wounds. In a consecutive series of "indoor" cases, taken over a four-year period, treated at the Montreal General Hospital with some modification of the above technique, there was only one of possible early infection, and in this instance the technique was not so rigidly observed. If scalp wounds are treated less radically, as is often the case, one may expect sepsis to develop in a certain number, which, if allowed to run unchecked, may on occasion give rise to the usual complications, ranging from spreading cellulitis to osteomyelitis and brain abscess. It is frequently considered that post-traumatic infection of the scalp is rare and that the scalp tends to heal well in any event. Such may be the case, but it is more common than is generally supposed. Patients are not infrequently admitted to the hospital because of scalp-wound infection, sometimes associated with severe complications.

The majority of our wounds were repaired within five to six hours of the accident, a few after a longer period, even after thirteen hours. The longer a wound has been left, the wider and more radical must the débridement be. Adequate shaving of the head about the wound and, preferably, in the male, of the whole head is important. Apart from the greater cleanliness and ease with which dressings may then be done, unsuspected abrasions and abnormalities may be discovered and treated. I have seen a severe cellulitis of the scalp develop from a minute unrecognized abrasion hidden by the hair at a great distance from the principal wound which had progressed favourably under treatment.

If a case is treated at once, after a relatively clean wound débridement may perhaps be unnecessary if adequate shaving with conscientious removal of dirt and of hair is done. Occasionally, however, under emergency circumstances wounds are of necessity quickly sutured to control bleeding and left even with hair sutured between the scalp edges. I have, on two recent occasions, found extensive masses of hair lying among bony fragments beneath healed scalp wounds. If quick suturing has been done as an emergency measure the stitches should be removed very early to relieve tension, and wet dressings applied as though the wound were already frankly infected. In addition to promoting an active hyperæmia of the part this will prevent crusting and too early sealing of the wound edges. If a depressed fracture lies beneath this may be elevated later through a new and separate scalp flap incision when the original wound is healed without infection. If less than twelve hours has elapsed since the

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From the Montreal General Hospital and the Montreal Neurological Institute.

accident, I have, in very dirty wounds, resutured after radical débridement.

Depressed skull fractures.—With regard to depressed skull fractures, those that are compound should obviously be elevated within the first few hours of the accident. As with the simple scalp lacerations, infection can be avoided if great care is taken with the débridement. In a consecutive series of cases, in the last four-year period at the Montreal General Hospital, including cases with cerebral herniation, to which others might be added from the Montreal Neurological Institute, there has been no instance of infection except in one extremely severe and complicated case where I elevated at the Institute more than thirteen hours after the injury. In this instance a mass of brain tissue had bulged through the badly torn temporal muscle, scalp and ear, and numerous bony fragments were embedded below the surface of the brain. Primary union took place, but a subsequent mild scalp infection, originating probably from the auditory passage, ensued, which cleared with treatment. On this occasion the whole of the left external auditory canal, which was extensively involved in the scalp wounds, had been laid bare along the floor of the traumatic wound. To make matters worse, this patient had had an otitis media upon this side during the previous year.

As has been said, with the simple scalp lacerations the longer the interval between the accident and the repair, the more complete and radical should be the débridement. Débridement should include damaged or contaminated dura and softened irrevocably damaged or dirty brain tissue. The removal in all instances should be as clean as possible, both to circumvent infection, and, in the case of the brain, to prevent as far as possible or minimize the meningeal scarring and subsequent susceptibility to epilepsy. To this end it is advisable to close the dura if this has been torn. This may be accomplished by splitting it into two layers. The outer layer may be turned back in the form of a flap or graft to cover the defect. Each case presents its own particular problem, and one may only voice certain principles of treatment without being too dogmatic about the details.

If depressions are not compound it is, as a rule, wise to elevate again early to avoid unnecessarily prolonged local pressure of the brain, but one may wait longer without fear of infection until the patient recovers further from the accident. If the depression is deep and is encroaching dangerously upon the brain it should be elevated as soon as conveniently possible. Very shallow depressions in silent areas, under special circumstances, might on occasion be left, provided no inwardly protruding spicules exist. These, however, may later be the site of local headache. If depressions are not elevated unexpected tears of the dura may be overlooked, with underlying brain laceration, which if left untreated will eventually cause scarring and perhaps epilepsy. A large shallow depression will decrease the size of the skull chamber, which is unphysiological, and the pulsating brain beneath may be chronically traumatized. In smaller, more benign-appearing but irregular fractures, small spicules not readily seen by x-ray may protrude dangerously inward.

Again, the depressed portion of the external table may be very small, whereas a very much larger portion of the inner table may be depressed, like the submerged portion of an iceberg, which may easily escape notice upon roentgenological examination. In a recent case the outer depressed face was only about 1 sq. cm. in area, whereas the inner was probably 1¼ square inches in area. In the presence of a skull perforation however small, with a free cerebrospinal fluid leak to the skin surface, it is obvious that the drainage tract must be repaired at once.

It is possible for a linear fracture to be depressed and for spontaneous reduction to take place. I have had one such case, in which a linear fracture extended from the front to the back of the skull on one side, involving the frontal, parietal and occipital bones and crossing the middle meningeal branches. In addition there was a line crossing the petrous bone. The skull in the parietal region above the fracture line was seen radiographically to be depressed about one-half of a cm. More especially because the depressed area crossed the motor cortex elevation was advised. A short time later, however, x-ray examination was repeated and the depression was found to have been self-reduced. At about this time also signs of intracranial tension, as judged by the pulse and the blood pressure, showed a decided improvement.

Depressions of the frontal bone are relatively common. In one such a very large proportion of the frontal bone above the supraorbital margins was depressed about 1 inch inwards.

The fracture line entered the frontal sinus, and the outer rim of the left orbit was rotated backwards. This injury was associated with a diffuse cerebrospinal fluid leak into the nasopharynx. When the patient coughed, at operation, air was forced through a relatively wide gap in the ethmoid plate, extradurally through the anterior fossa of the skull into the operator's face. In this instance the relatively wide communication through the ethmoid plate was closed with a portion of muscle. The tear in the dura, which was not large and found to be more anterior, was closed with two black silk sutures. In addition to this the same patient had a depressed fracture in a most unusual location, in the occipital bone, about 1 inch posterior to the foramen magnum on the right side. Roentgenographic examination showed two sharp pointed fragments to be pressing deeply in the direction of the posterior inferior surface of the right cerebellar hemisphere. A very large tender swelling and hæmatoma was present over the back of the patient's neck. It is of neurological interest that the man exhibited one noteworthy cerebellar sign, *i.e.*, an outward drift of the arm on the affected side. He had no demonstrable ataxia as tested by the finger-pointing tests. It is equally interesting that this "cerebellar" sign cleared only after the occipital fracture had been elevated five weeks after the first operation, and would seem, therefore, to have had no relation to the frontal fracture, which might have been supposed from the work of Goldstein. It is important to note that this occipital depression was of much greater extent than had been suspected from the x-ray findings. It involved most of the occipital bone upon this side and was depressed at the centre about one inch. The bone was shattered into some four to five fragments. The depression extended from the lateral sinus region to within one-half inch of the foramen magnum, and from the postmastoid region to within half an inch of the midline. Granulation tissue was present in two small areas, showing where the dura had been damaged, but there was at that time no leak of the cerebrospinal fluid. The dura was also under great tension, and much bleeding was encountered as in a case exhibiting high posterior fossa pressure. This tension was relieved at once when the fragments were elevated.

It is possible to have a depression fracture of the base of the skull. In the case of a man who had a depression fracture of the base of the middle fossa the surface of the petrous bone was depressed about 2 mm., which exerted pressure upon the facial nerve, with a resultant palsy. The fracture extended as a large cartwheel depression, to involve the temporo-parietal region. Eight days after this very severe injury this man sought help from his doctor because his mouth was twisted to the right and because he could not close his left eye. He was referred to the hospital at once. He was found to have a complete left facial paralysis and an early papillœdema, the precise explanation for which was not clear, unless it was due to reduced volume of the skull or cerebral œdema. Elevation of the cartwheel fracture was performed and the petrous ridge elevated to an almost normal level. His papillœdema subsided, and some sign of recovery of the facial paralysis was noted before he left the hospital.

A compound depression of the whole of the outer half of the frontal sinus, anterior and posterior wall, together with a shattering of the roof of the orbit, took place in another case. Brain presented on the side of the patient's nose. The depressed part was removed entirely, together with the shattered fragments of the roof of the orbit. In the case of a child who was struck behind the ear in a street car accident the patient was found to have sustained a compound fracture of the mastoid bone. The resulting lesion to my inexperienced eye appeared exactly like a recent radical mastoidectomy. In this instance I summoned the otolaryngologist to complete the operation. He found that the exposure was already quite adequate, and with some débridement and cleansing the patient did very well.

It has been our custom in non-compound fractures of some extent to replace as far as possible some bony fragments. In occasional compound cases we have replaced fragments of bone after sterilizing them by boiling. Old large skull defects often provoke neurasthenia, headache and fear in patients. These may be closed satisfactorily with rib grafts. The curvature of the rib lends itself well to this end.

It is important to examine carefully for depressed fractures, both by palpation and by x-ray. If there is a laceration direct inspection can be made. One may sense a false depression in the region of a hæmatoma, but, more important, it happens that real depressions are some-

times overlooked because of the lack of external and neurological signs; the brain then must continue to pulsate against the depressed fragments which may or may not be covered by dura. The overlying wound, if any, is sutured without due regard to the history of the case, which may be very suggestive, and without examining the interior of the wound. If infection occurs, disastrous results follow. If, however, infection does not occur there will still be an opportunity to elevate later, when the immediate period for sepsis is over, through a separate scalp flap, if the wound has been satisfactorily treated. As stated earlier in this account, I have recently treated two such cases. In both instances the wounds healed by primary intention, but in both hair was found later among the depressed fragments. In one of these the patient was struck on the head by a bottle which had dropped five storeys. The bottle is said to have contained javelle water and it is suggested by a humorous associate that this may have sterilized the wound. In the other instance the patient had slipped, striking his head against the point of a rock. On each occasion the history of the accident was suggestive. However, as is frequently the case in depressed skull fractures, unconsciousness did not follow, and practically no neurological signs were found except for the slight indication of a left facial weakness. On the other hand, I have treated a third patient who was not so fortunate. This time the original small laceration was infected, and subsequently an underlying depressed fracture with osteomyelitis was found beneath the wound. I saw the patient shortly after the development of a right frontal brain abscess and though the latter has been successfully drained the patient will remain an epileptic suspect.

Depressed skull fractures often give interesting local signs, some of which are only recognizable on careful neurological examination, *e.g.*, a small depression over the midline and to the right of the midline in the immediate postcentral region caused loss of sense of position in the left great toe and absence of two-point discrimination over the sole of the foot. Interestingly enough, the patient experienced paræsthesia of the left leg below the knee and foot. A small area of bluish discoloration could be seen through the dura at the point of depression. The symptoms and signs have cleared almost completely since the fragments were elevated. In a second patient, to whom I have already alluded as having slipped and struck his head against a rock, the depression caused an almost imperceptible cortical facial weakness. In a third case, previously mentioned, a lower motor neurone paralysis of the facial nerve was produced by a depression of the superior surface of the petrous bone. In a fourth case, described above, the depressed fragment pressed upon the lateral cerebellar hemisphere. This produced a single neurological sign, *i.e.*, lateral drift of the ipsolateral arm. Such findings as these demonstrate the necessity for careful neurological examination of these patients.

Immediate improvement of a local brain function may be seen after elevation of a depression even when the latter has been present for some weeks. A most significant case was one in which the patient arrived in the Montreal Neurological Institute four weeks after the injury. He had a fair-sized depression over the motor speech area, and had been well but partially aphasic since the accident. Considerable scarring had taken place beneath the bony fragments between the brain and the torn dura, and numerous large vessels were present. Though the fracture had occurred one month before admission the patient commenced to speak better on the same day after operation, showing a remarkable return of function. As soon as the fragments were elevated and the scar dissected, to relieve pain and pressure, improvement set in. How much worse might the consequences have been if the fragments had been allowed to remain even longer!

In the time available in such diffuse discussions, one may of course only mention some of what seem to the speaker to be important and practical points which, strangely enough, are points of controversy.

Linear fractures.—As regards linear fractures, those of the base are of particular importance when they allow cerebrospinal fluid to escape into the nasopharynx or into the external auditory meatus. Treatment in such cases is modified so as best to stop leakage without either blocking the pathway of escape or of causing a retrograde flow. In these instances, which form indeed a major problem in the treatment of skull fractures, one hesitates to make a lumbar puncture through which one might reduce intracranial pressure and lessen further leakage. On the other hand how can one shorten

the period of leakage safely? It is true that in most severe cases, as would naturally be expected, the leak of the cerebrospinal fluid itself reduces the intracranial pressure to a low normal figure. Nevertheless, in many cases, but not all, I have performed a lumber puncture at a time chosen for the individual case and have sometimes repeated it at studied intervals. In these cases I have refrained from reducing the intracranial pressure beyond a low normal figure and the fluid has been drawn slowly. I have in addition elevated the head of the patient's bed to a fair slope. This may be carried out in suitable stages. Naturally, in cases with a profuse leak the spinal fluid pressure may already be low. The patient is cautioned against straining of any kind, and especially in the case of a nasal leak against blowing his nose. Meningitis is a real menace in these cases. In the majority the leak stops in the first twenty-four hours, but not by any means in all. The outlook is much more serious when there has been a previous history of otitis media in the case of leaks from the external auditory meatus, or of sinusitis in those from the nasopharynx.

Under certain conditions of long-continued and profuse drainage one might consider an operative procedure for direct closure of the point of dural rupture. Such for example as was mentioned in the case of the man with the severe frontal depressed fracture in whom a small portion of muscle was placed over the point of leakage through the ethmoid plate. In the absence of a skull defect through which to work it might be justifiable to make, as suggested by Coleman, such a closure of the dural opening through a small bone flap.

Some years ago my colleague, Dr. Guy Johnson, suggested draining the cerebrospinal fluid through a clean field in the subtemporal region in cases with a cerebrospinal fluid leak through the ear. I have frequently considered the procedure, but have only carried it out in one already infected case. The patient had a rather profuse and persistent leak through the ear with signs of meningeal irritation. The operation, however, was not done until the third day, with the view not only to side-track the leaking fluid but also to help in the establishment of forced drainage of spinal fluid. In this instance, as in so many of cerebrospinal meningitis, this procedure was of no avail. I do not yet feel satisfied that it is the best method, to cure one leak by creating another; on the other hand, the procedure should be considered as a possibility.

In one unusual case the patient sustained a most extensive fracture of the base of the skull which completely severed from bony attachment the face from the skull. When the patient opened his mouth or relaxed his jaw muscles a wide gap could be felt traversing the nasal bone near its junction with the frontal. The face as a whole was freely movable upon the skull. The fracture passed horizontally backward through the ethmoid and sphenoid bones to traverse the floor of the middle fossa and to cross at least one petrous bone. The patient suffered a complete right sixth, seventh, and eighth nerve palsy and a mild hemiparesis. In association with Dr. Fitzgerald, who referred the case to me, and the oral surgeon, Dr. Walsh, the lower head was secured against the upper by a splint applied to the maxilla which was tied up to a skull cap with elastic bands. The patient recovered, but his face remained with a backward displacement of 1 to 2 mm. His spinal fluid leak lessened at once but continued for several days. The most careful attention to bed posture and to the condition of the patient's nasopharynx and accessory sinuses was continuously carried out, to avoid ascent of infection, and must be considered the most important part of his treatment.

In the absence of a cerebrospinal fluid leak in fractures which cross the petrous bone one may still note the bluish discoloration of blood behind the drum, and may find ecchymosis over the mastoid bone. These signs may not be visible until the day after the injury. In the presence of a cerebrospinal fluid leak the ear canal need not and should not be directly examined and contaminated with a speculum. A sterile sponge laid over the ear to absorb and thus prevent a retrograde flow of fluid as it trickles out is sufficient. Painting the auricle with weak iodine or alcohol may be advisable.

X-rays show their value in linear fractures crossing the middle meningeal artery, and may confirm the signs which point to the presence of an epidural hæmorrhage. Stereoscopic pictures should be taken of both sides of the skull. An x-ray of the right side will not necessarily show a fracture of the left. In cases where epidural hæmorrhage is suspected roentgenological examination should precede lumbar puncture,

which, as will be mentioned later, may be a source of danger in these cases. From fractures over the vertex one may naturally expect some bleeding from the median longitudinal sinus. Fractures of the occiput are common and frequently cross the lateral sinus. Massive subarachnoid and subdural hæmorrhage may occur in any combination and increased posterior fossa pressure develop therefrom. Such cases, as pointed out by Oddy, may occasionally require suboccipital exploration and drainage.

Lesions of the scalp and skull alone which require such varied therapeutic management form after all the lesser number of head injuries. The remainder fall into the categories of damage to the brain and its coverings, including cerebral concussion, with or without subarachnoid bleeding, cerebral contusion and laceration, intracerebral bleeding, and those involving the highly important spaces about the brain, that is to say, those cases of epidural, subdural and subarachnoid blood and fluid collections.

Brain lesions.—By cerebral concussion is meant a head injury followed by loss of consciousness. The mechanism by which the unconsciousness is brought about is still unknown. By cerebral contusion is usually meant a definite visible bruising of the brain which may be seen at operation or autopsy, and may be recognizable clinically by neurological signs, by laceration, a definite tear or gap in its continuity.

Areas of petechial hæmorrhage are seen in the majority of cases with cerebral involvement coming to post-mortem. Such areas are most commonly seen beneath the frontal poles and at the temporal lobe tips. Larger localized hæmorrhages may occur. One such discrete lesion I have had which lay between both the red nuclei. The symptomatology consisted of a combination of pyramidal tract signs and decerebrate rigidity with continued unconsciousness. The neurological localization was confirmed by post-mortem examination.

Dr. Cone has stressed the importance of the semi-rigid partitions within the skull, such as has also been suggested by Meyer, against which the brain may be made to impinge to produce petechiæ of the corpus callosum and of the cerebral peduncles. To what extent these petechiæ contribute toward unconsciousness, if at all, is unknown. The larger ones, or the larger groups, or those more centrally placed no doubt contribute to the production of general and neurological signs. For example, if they lie about the floor of the third ventricle one expects hyperthermia and autonomic imbalance. If they occur in the midbrain unconsciousness is apt to last and pupillary changes may be evident, while decerebrate rigidity may be seen when they occur in the region of the red nuclei, etc. If resorption takes place or the swelling in the neighbourhood of the centres involved subsides the patient may survive. The treatment of such conditions is principally medical, control of temperature, nourishment, fluid balance, the control of brain swelling; study of pulse, respirations and blood pressure.

Regarding cerebral concussion, early lumbar puncture with associated controlled bedrest will prevent in most instances post-traumatic headache. If much subarachnoid bleeding is found I prefer to repeat the lumbar puncture on one or more occasions to suit the individual case, even though, as found by Sprong, the blood tends spontaneously to disappear within the first five to six days unless fresh bleeding continues. Lumbar puncture is probably the most useful diagnostic and therapeutic procedure we have for the treatment of head injuries. It must be used carefully, however, and with discretion. It can especially in cases of epidural hæmorrhage be a source of danger. It would seem from our series of cases that those patients who have returned to us and those who have come to us as new patients with post-traumatic headache are nearly all those in whom for some reason or another lumbar puncture was omitted. I believe that the early puncture allows the brain to descend, causes a rupture of or may prevent formation of fine, early, pial arachnoidal adhesions.

The treatment of cerebral contusion and of intracerebral damage of all types depends upon the nature and location of the lesion. For example, the vegetative nervous system may be considerably involved. The question, as already briefly stated, is one largely of medical and symptomatic treatment and proper general supervision of the unconscious patient. The treatment of cerebral laceration is dealt with under the section of depressed fracture.

Epidural hæmorrhage.—Actual surgical measures are more apt to be used in those cases of involvement of the potential spaces about the brain, the epidural and the subdural space. The epidural hæmorrhage occurs as a rupture

of the middle meningeal artery or one of its branches. I would suggest that it may occur from accompanying blood sinuses which have been described by Thompson. I have recently noted the presence of well-formed middle meningeal sinuses in a case of brain tumour. This might account for a slower developing type of symptomatology which may be met with. In the common type the force of the arterial blood strips the dura from the bone. The result is a localized mass of hæmorrhage, which, because of its position near the motor cortex, produces characteristically an advancing hemiparesis and pupillary changes. One mechanism producing the latter, in view of recent work by Cone and Reid, is probably due to pressure upon the third nerve as a result of herniation of a portion of the hippocampal gyrus in the neighbourhood of the incisura tentorii. Apart from this there is a general rise of intracranial pressure evidenced by pulse, respiration, blood pressure changes, and an increasing drowsiness to complete the well known history of the free interval.

When the rise of intracranial pressure is great a type of extreme bilateral rigidity can result, which is due no doubt to the incidence of the cerebral peduncles against the edges of the tentorium. I have seen such a fatal state follow a few hours after a spinal puncture. Lumbar puncture in all these cases is dangerous, though as a rule necessary. But one should be prepared to operate at once after the puncture if the indications are clear. As I have stated earlier, I make it a practice in all such to postpone puncture until all else is ready, including especially the x-rays.

The course is generally rapid, and early operation is indicated. The mortality rate is high unless the case is operated upon very early, owing to the irrevocable brain damage. A patient may thus succumb even after a successful decompression has been made.

Subdural hæmorrhage.—Conditions involving the subdural space form a most important part of intracranial lesions. The symptoms arising from collection of blood here are often slow of appearance, obscure and meagre. The patients react favourably to treatment. Symptoms may develop weeks and months after the injury and last for years before detection. The injury may be slight. In acute cases there is generally a free interval much as in epidural hæmorrhage, followed by increasing drowsiness or headache. The patient may recover but may continue to have, or later develop, general headache, irritability, mental fatigue, epilepsy and psychosis. He may, or may not have neurological signs. To illustrate, may I give the summary of a case of chronic subdural hæmatoma.

In 1927 a patient was seriously injured in an airplane accident. He was unconscious for three days afterward. He recovered, but suffered off and on from severe headaches and insomnia. Three years after the accident he commenced to have certain strange psychic disturbances, probably of an epileptic nature, associated with auditory hallucinations. In 1933, six years after the accident, he developed definite attacks of petit mal and shortly afterward grand mal. He became depressed. He was studied abroad in 1933, and lumbar puncture studies were found to be normal, including pressure readings. In 1936 the patient was brought to the Montreal General Hospital as an emergency case following a bullet wound of the skull. He made a fair but only partial recovery after a critical period of some three weeks. Elevation of his depressed skull fracture was carried out, and an exploration for further intracranial complications made. In addition to the small depressed skull fracture from the recent bullet wound a very large subdural collection of blood was found enclosed in very well organized membranes. Though there was evidence of a more recent addition to the mass it was clear, grossly and histologically, that this was an organized blood clot dating from the original injury nine years previously. The membranes were removed through an osteoplastic bone flap and recovery took place.

The material trapped in the subdural space may be fluid, blood, or membranes containing bloody material. The cerebrospinal fluid presumably comes as the result of a tear in the arachnoid and is trapped. Bleeding probably most frequently occurs as the result of a tear in a vein, presumably before its entrance, for example, into the median longitudinal sinus.

It is possible that some mild cases of simple fluid collection may be cured by lumbar puncture, but those showing continued symptoms should be relieved by simple drainage through burr hole openings. In the chronic cases with a well organized sac, some likewise drain through burr hole openings. The method of incising the membranes through a small craniotomy to allow the brain to expand and cause collapse of the sac, as suggested by MacKenzie, should be satisfactory. Where the membranes are very well organized some prefer to remove them through an osteoplastic flap.

Apart from clinical examination, one may find evidence of brain displacement by a shift in the position of the pineal gland, and encephalography in doubtful cases will show characteristic findings. Air insufflation after relief of pressure demonstrates a gradual slow return to a normal

position of the ventricular system and opening of the subarachnoid space.

Time will not permit a detailed discussion of the treatment of this condition, but one may say that it is possible to have all varieties of traumatic fluid collection within this space. *e.g.*, cerebrospinal fluid, fluid blood, clotted blood, and fluid and organized blood enveloped by membranes. Treatment depends therefore largely upon the nature of the material present.

THE SURGICAL TREATMENT OF FACIAL INJURIES*

By FULTON RISDON

Toronto

IN this short paper no attempt is made to deal with cerebral trauma, such as hæmorrhage, contusions or lacerations of the brain substance, but it is my purpose to deal with injuries of the face, including the supporting bony structures. I am of the opinion that all displaced bones about the face should be replaced at the earliest possible opportunity. This may mean neglecting the care of the contused wounds until the underlying bony structures are elevated to their normal contour. When the patient has been severely injured prompt attention should be given to the treatment for shock, then consideration of injuries other than facial, and finally the care of injuries about the face including the supporting structures is to be planned.

THE CLEANSING AND CARE OF WOUNDS

Contused wounds of the face require special care, as all foreign bodies, such as dust and particles from the road, should be removed with a hand brush and green soap and peroxide before any attempt is made to approximate the incised areas; this is best done under a general anæsthetic. Generally speaking, the edges should not be trimmed unless they are badly torn, as considerable tissue which may appear devitalized will live. At this time we should plan for future excision of the scars should that prove necessary, rather than lose tissue which will be of value later, and especially does this apply around the eyelids and the nose. There are two suture materials that I favour, the first and finest of which is the so-called "plastic suture" which I believe to be a Japanese fibre, or the very finest dermal; the other is horsehair. My reason for favouring these sutures is that they are easily removed, and act as a miniature drain if not tied too tightly. On completion of the approximation of the wounds with small needles, anti-tetanic serum, 1,500 units, is liberated in the wounds with a hypodermic syringe in divided doses. If there is a special nurse on the case, I have small sterile applicators prepared and serum is not allowed to collect over the sutures. Otherwise, I use small strips of lint held in position with liquid adhesive. No other dressing is employed.

FRACTURES OF THE NASAL BONES AND ASSOCIATED PARTS

Due to the automobile accident depressed fractures of the nasal bones are quite common. In these cases the nasal bones are forced into a posterior position along with the nasal spine, the nasal processes of the maxillary bones, and the upper bony section of the septum into a close relationship with the cribriform plate, but in my experience the cribriform plate is seldom perforated. When such an injury occurs and the



Fig. 1

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Ottawa, Section of Surgery, June 23, 1937.

patient's condition warrants it immediate correction can be done by finger manipulation. With a gloved index finger, under a general anæsthetic, the parts can be moulded and returned to their normal position, and maintained there by a splint which is held in position by one section on the forehead and the other on the upper teeth (see Fig. 1). (This splint will be described at greater length later).

FRACTURE OF THE MAXILLÆ

The common injury is a bilateral fracture of the maxillæ *en masse*. In these cases the entire upper jaw is carried to a posterior position due to fractures of the nasal bones, nasal processes of the maxillæ, infra-orbital borders of the orbit, anterior walls of the antrum, and, in most cases, the pterygoid processes of the sphenoid bone. It is quite obvious that there will be a marked depression of the middle section of the face, and advancement must be attempted at the earliest possible opportunity. This is quite satisfactorily accomplished when the patient has upper teeth, as in most of these cases the lower jaw is intact and may be used as a splint, and quite the reverse of a fracture of the mandible when the upper jaw is used as a splint. In treating these depressed fractures of the upper jaw *en masse* a cast Victoria metal splint is made to fit all the upper teeth, and on the outer surface, starting at the molar, a snake wire is soldered from the right molar to the left molar and the same is made for the lower jaw. Then under a general anæsthetic the upper jaw is forcibly carried forward to its normal position by a wire around the upper anterior teeth and fixed to the lower jaw; that is, wires pass from the cemented splint on the upper jaw to the cemented splint on the lower jaw and are twisted together. A further aid is a rubber dam bandage, six inch sheet rubber, as used by the dentist, which is tied around the chin and over the parietal area of the head, and in this way the lower jaw is kept in apposition to the upper. This position is maintained for three to five weeks. When the patient is edentulous the problem which confronts the operator is what method to use to maintain the upper jaw in a forward position. Generally speaking, that can be held by a plaster of Paris head bandage with thirteen to fifteen gauge bars incorporated in the plaster bandage, and brought downward to permit the wires being thrown around the upper jaw. By tightening these wires over the bars from the head bandage the upper jaw is secured. Many other methods for holding these forward have been devised but in my opinion they are too complicated and are quite unnecessary. Fortunately, on this continent most of our patients have teeth which may be utilized in splinting.

FRACTURES OF THE MANDIBLE

Fractures of the lower jaw are perhaps the most common accident met with today in facial injuries. In all fractures about the jaws the occlusion, or in other words the way the upper teeth meet the lower teeth, has to be considered as guide for the proper reduction. When the dentist speaks of occlusion he means that the upper teeth interdigitate with the lower teeth in their normal position. In all fractures of the lower jaw properly taken x-rays (I prefer stereoscopic) will show the amount of displacement and comminution if any, and whether there are teeth in the line of fracture. Speaking generally, all teeth in the line of the fracture should be removed, but in many cases they may be saved for a week or ten days to assist in maintaining proper relationship of the lower and upper teeth. To maintain this occlusion many types of wiring and splints have been devised but they can be mainly divided into two. The first, a cast splint; that is, an impression is taken of the teeth and a splint is cast of Victoria metal to fit accurately the teeth, and it may be necessary to cast one for the upper as well as the lower. Then to this splint, snake wire is soldered on the labial or outer surface, so-called because of spaces which are left for inter-dental wiring, and then the upper and lower splints are ligated together. This is a very useful method, but expensive and rather difficult to apply, but it is necessary in some cases. I have the splints cast by a dental mechanic and then cemented on with black copper cement. Victoria metal is supplied by the dental supply houses, and I understand is an alloy of zinc and copper but the formula is a secret one. The other method, and the one which I prefer, is wiring. That is, wires are applied to the upper teeth in such a way as to make loops between the teeth, and the same on the lower and inter-dental wiring maintains the lower to the upper.

I have recently devised a method which appears to me to be much simpler. That is, heavy bronze wire, which may be obtained from the

dental supply houses in fourteen-inch lengths, is thrown around the upper second molar and twisted on itself from that position along the outer or labial surface of the upper teeth and brought well beyond the angle of the mouth, being held there with an artery forceps. The same is applied to the opposite side of the maxilla, namely, wire applied to the molar area and twisted on itself until it meets the wire from the opposite side and the two are then twisted together in the centre line. Individual teeth are then wired to this twisted arch and the same type of splint is applied to the mandible. That means we have a twisted wire from molar to molar on the upper and lower jaws with each individual tooth wired to the arch, and inter-dental wires are used to hold the so-called occlusion or approximation of the lower teeth to the upper teeth. This simple method is applicable in a great percentage of cases, and with experience a number of variations will become apparent. I am of the opinion that it is the most flexible method introduced so far, and it can be utilized in the operating-room at any time to fit almost any type of fractured jaw. Three to five weeks are necessary for bony union. Fractures of the condyle may be a complication, and I believe that the head of the condyle can be manipulated into position. By using this inter-dental wiring an excellent functional result may be obtained without operation, as with removal of the condyle there will be a certain loss of the normal excursion of the lower jaw. The only special consideration is that movement is started earlier when there is a fracture of the temporo-maxillary articulation. I am especially interested in this type of treatment because bone wiring is sometimes attempted, generally resulting in failure, or the head is excised, neither of which procedures I believe to be necessary.

FRACTURES OF THE INFRA-ORBITAL RIDGE, MALAR BONES AND ZYGOMATIC PROCESS

Much has been written recently on the treatment of this type of fracture, and many ingenious methods have been suggested. Most of these I find applicable in the very simple case, usually that without comminution. When the bones in these areas are comminuted there is in my opinion only one good method of holding the small sections of bone. That is by supporting the restored minute pieces of bone with iodoform gauze packing in the antrum of Highmore, leaving them in that position for eight to ten days. If there is a simple fracture through the zygoma it is quite easy to elevate within the mouth, and the same I believe for the malar bone, but some method as a rule must be devised for maintaining the elevated bones. I have found simple elevation to be insufficient, as specific gravity and the weight of the muscles drag the elevated bones to a lower position. In other words it is easy to elevate the infra-orbital ridge, the malar bones and the zygoma, but difficult to maintain them in position. A further suggestion for maintaining them would be to use a plaster of Paris head bandage with perpendicular pieces of wire incorporated in the bandage before it sets, dropped over the zygoma or the malar bone on that side, and wires are then arranged from this bar to the fractured part. I have found the method of supporting the infra-orbital ridge and malar bone through the antrum most satisfactory.

There is another and very definite consideration about facial cases, namely, where tissue has been completely removed. There may be a section of the ala or of the upper lip, loss of the soft tissue in upper or lower eyelids, total loss of the nose (as in one of my cases), and in another, complete loss of an auricle. I am unable to completely outline the repair of such cases at this time, but, generally speaking, when a section of the nose has been lost and it is evident that tissue will have to be supplied to restore the contour I would suggest sewing the mucous membrane to the skin, preserving the original loss and in this way preventing the usual contraction due to scar tissue. Later when the patient's condition warrants it, plans are made to bring a pedicle flap, or a direct flap to restore the loss, and if skin only has been lost, a Wolfe graft should be attempted, as the colour is more like that of the surrounding tissue. If the soft tissue overlying the mandible is lost at the same time that there is a non-union of the lower jaw it is more practical to reconstruct the neck before attempting a bone-graft, and grafting should be delayed until a period of six months has elapsed after the last evidence of suppuration.

There is another type where the injury to the nose is sufficient to cause loss of the septal cartilage. In this case drainage of course is instituted early and the necrotic cartilage is

removed if necessary. Then a period of four to six months should elapse before any attempt is made to restore the contour or bridge of the nose. When this is attempted I am convinced that the best material to use is cartilage, although I am aware that bone is used more now than it was some years ago. My reason for this statement is that I have followed cartilage buried in a patient for fifteen years, and on removal and sectioning the cartilage existed as such, whereas bone had disappeared much earlier; even at the end of one year, there is very little to be found, due to sterile atrophy. In making a nasal cartilage repair I always prefer to do it through the columella, but there are some cases, especially where the nares are depressed, when the columella will have to be divided at its attachment to the upper lip and thrown well up over the nasal tip to allow for the cartilaginous support to be inserted so as to restore the bridge as well as the columella. We obtain the cartilage from the rib area, observing strict technique throughout. This part of the operation should be completed before approaching the nasal area.

I mentioned above a nasal splint which is used as a rule for the correction of an old nasal deformity, by which I mean that the nasal bones have been fractured and left in an abnormal position and now require refracturing and probably elevation. In all these cases a splint is necessary, and the one which I would suggest is a flat section which is attached to the forehead, held there by plaster of Paris bandage or adhesive. Another section is attached to the teeth with an upright extending beyond the elevation of the nose, and then a bar is dropped from a flat part of the splint on the forehead to the attachment on the teeth (see Fig. 1). This merely gives us a fixed appliance over the nose and to this is attached an adjustable splint which maintains the nose in an elevated position, and if further elevation is necessary there is an attachment to this splint which operates intranasally, but I find that seldom necessary.

A SOLUTION TO THE MYSTERY OF "CHRONIC APPENDICITIS"*

By W. A. BIGELOW, M.D.

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THE object of this paper is to give a report from our Clinic of the end-results of operation on the so-called congenital bands and membranes of the cæcum and ascending colon, including the hepatic flexure.

A questionnaire was sent out in January, 1937, to only those on whom appendectomy had been performed elsewhere, previous to operation at this Clinic, to cure a chronic right-sided abdominal pain, and in whom the diagnosis had been made of "chronic appendicitis". None of the patients included in this report had experienced any relief whatever from the appendectomy performed. Great care was taken to exclude all cases which had been diagnosed and operated on for acute appendicitis. The patients were operated on by our usual method of complete removal of all so-called congenital bands and membranes from the cæcum or ascending colon, or hepatic flexure, or any combination of these present.

One hundred and forty-seven patients responded to this request, which asked only one question, *viz.*, "Have you been completely relieved of your right-sided pain since your operation for bands at this Clinic?" One hundred and thirty-six reported complete relief from right-sided pain; eleven reported, not cured. This gives a result of 92 per cent cured by this operation.

EVIDENCE OF EXISTENCE OF BANDS AND MEMBRANES OF THE CÆCUM AND ASCENDING COLON

Buecermann[1] gives an exhaustive bibliography of writings on the subject of bands and membranes of the colon and terminal ileum. Going back into history the following men write from the standpoint of pathological anatomy of the colon concerning developmental defects found in the normal and abnormal attachments of the right half of the colon and lower ileum, *viz.*, Soemmering, Virchow, Toldt, Treves and Jonnesco. The following have described and reported cases of so-called chronic appendicitis,

* Read before the Manitoba Medical Association at Winnipeg, May 20, 1937.

associated with omental, gall-bladder, appendiceal, colonic and ileal membranes and bands, and in which cases colicky right-sided abdominal pain and other symptoms of partial obstruction of the bowel were manifest. Removal of the appendix only, in the presence of constricting membranes of the right half of the colon, was found to mean a persistence of the major symptoms—Riedel, Lounstein, Hochenegg, Haberer, Jackson, Lane and Harvey.

To illustrate the gross appearance of the bands and membranes, as seen at operation, we submit these photographs, taken at the time of operation, as shown in Figs. 1 and 2. The surgical technique of the removal of these bands, is referred to in a previous paper.[2]

Two previous "call-in" reports were published by this Clinic.[3] The first gave very favourable results from 105 responses; the second[2] also gave a complete cure from right-sided pain in 93 per cent of the 520 responses.

This report, called in January, 1937, is summed up as follows.

ANALYSIS OF CALL-IN REPORT

147 answers to 169 requests.
136 reported cured.
11 reported not cured.
92 per cent cured of right-sided pain.

Of the 11 cases reported *not cured* 4 were re-examined at the Clinic with the following results.

Two patients gave evidence of post-operative peritoneal adhesions from post-operative peritonitis. These two were re-operated on and cured.

One case, on re-examination, was diagnosed as neuralgia of the iliohypogastric nerve.

One patient had no pain after leaving the hospital until subsequent pregnancy and confinement, so reported similar right-sided abdominal pain.

Seven patients did not come back for check-over.

CONCLUSIONS

1. That the so-called congenital bands, membranes and folds of cæcum and ascending colon sometimes occasion pathological symptoms. The main and outstanding one is right-sided abdominal pain.

2. That this main symptom of pain is curable by properly performed surgery, with proper post-operative treatment.

3. That failure to recognize this will explain some of the failures to cure "chronic appendicitis" by appendectomy.

4. That to get results, no other operative field should be employed and no exploration of the abdomen done after the band section has been started.

5. That these bands and membranes do not reform if once thoroughly and properly removed.

6. That adhesions may form, and do form again, if these surgical principles are not carefully carried out.

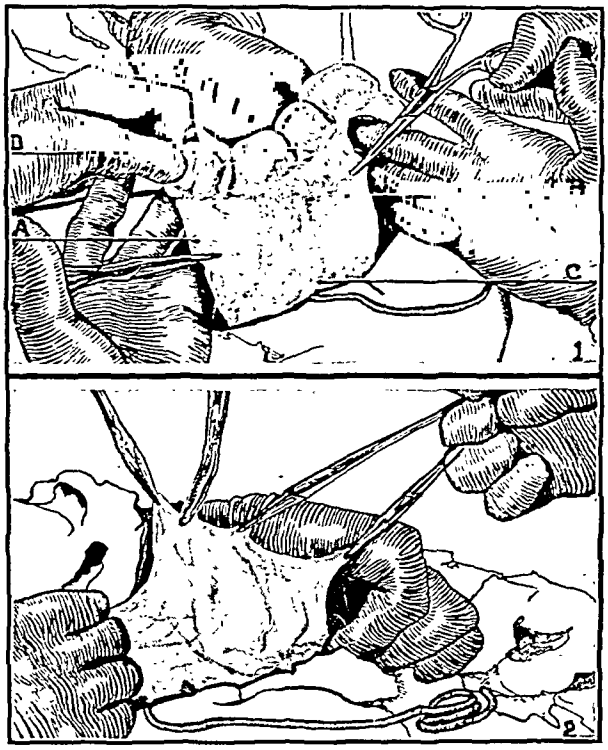


Fig. 1.—Represents bands under tension, previous to cutting.

A—Superior border bands.
B—Inferior border bands.
C—External lateral border of bands.
D—Represents the colonic attachment of membranes.

Fig. 2.—The forceps are on the free edge of bands after their separation from the colon.

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BASAL PULMONARY LESIONS*

By HERBERT R. CORBETT, M.D.

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ROENTGENOLOGICAL examination of the chest, on account of the varying opacities and densities, offers a wide field for investigation and accurate diagnosis. Improved technique, resulting from the perfection of apparatus, has permitted the production of chest films that would not have been considered possible a few years ago. But the distribution of x-ray apparatus far exceeds the distribution of knowledge of x-ray interpretation. After installation of equipment many physicians have realized that x-ray diagnosis is an art and a science to be gained only by study and experience, not a gratuitous endowment bestowed by the manufacturers. The public is becoming chest-conscious as well as cancer-conscious, and it is not difficult to induce them to come forward for x-ray examination.

In the short period at my disposal it is obviously impossible to discuss or even summarize all the various conditions that may produce basal infiltration. Therefore I wish to deal with the common diseases occurring in adults, and to stress from a roentgenological aspect the technique employed in bringing such cases to a diagnostic conclusion.

The more commonly recognized lesions that produce increased density in the lower pulmonary field are: (1) lobar pneumonia;[1] (2) influenzal pneumonia; (3) bronchiectasis; (4) lung-abscess; (5) tuberculosis; (6) chronic interstitial pneumonia; (7) neoplasm; (8) mycotic infections. This list is an arbitrary one, although it includes the more common pathological entities. No one disease remains specifically basal, any more than tuberculosis, for instance, is always apical or subapical. C. B. Peirce (personal communication) states: "The common pulmonary lesions beginning in the lower half of the lung field are, in order of importance: (1) minimal or subclinical lobular pneumonia; (2) bronchiectasis: (3) pulmonary abscess; (4) primary malignancy; (5) tuberculosis.

Some authorities[1] state that if the mottled shadows of tuberculosis were characteristic one should be able to differentiate them from those of chronic non-tuberculous infections. It is my personal opinion that those of us who have made a study of many chest films recognize and appreciate the fine flocculent type of mottling and the small moth-eaten areas of cavitation which characterize early exudative tuberculosis. But such recognition and differentiation come only from experience.

It is a fact that clinical and necropsy studies in adults reveal that tuberculosis is responsible for at least 90 per cent of all chronic lesions in the upper third of the lung. When the lesions are in the apex of both lungs tuberculosis is responsible for an even higher percentage. Conversely, a lesion in the lower third of the lung is in 90 per cent of cases found to be non-tuberculous, and when both bases are involved it is even more apt to be of other etiology. According to our records the incidence of localized unilateral basal tuberculosis, confirmed by the finding of tubercle bacilli in the sputum, is approximately 3 per cent.

Basal tuberculosis must be distinguished from the following: influenzal pneumonia; bronchiectasis; lung abscess; neoplasm; post-pneumonic fibrosis; lobar pneumonia; fusospirochætal pneumonia; passive congestion, and other rarer conditions such as actinomycosis and pulmonary syphilis. The differentiation will be easier if there should be an upper lobe infiltration resembling tuberculosis in the contralateral lung. However, this is not always diagnostic, for a cross infection due to some other lesion may be present.

Influenzal bronchopneumonia (subclinical pneumonia).—The existence of a small patchy area or areas of bronchopneumonia associated with severe colds, particularly in children, adolescents and young adults, occurs more often than is realized. The majority of such patients are treated at home, consequently we see only a few in the acute stages. The film appearance, as we see it, consists of a lobular consolidation

* Read at the Annual Meeting, Canadian Medical Association, Section of Radiology, Ottawa, June 24, 1937.

of moderate density and varying size, with irregular and poorly defined margins, very similar to the confluent tuberculous lesion seen in the upper lobes. Occasionally these lobular areas coalesce to form pseudo-lobar consolidation which cannot be distinguished from true lobar pneumonia. Although the rapid clearance of the shadow of suspected influenzal pneumonia may be regarded as proof of its non-tuberculous character, we must bear in mind that in occasional cases there is an imperfect resorption of the exudate, together with interstitial fibrous changes, which may cause a persistence of the x-ray opacities for some time, necessitating laboratory and opaque oil studies. Basal tuberculous lesions do not, as a rule clear up rapidly; they usually extend and excavate. While the identification of tubercle bacilli in the sputum is the final factor in the diagnosis of basal tuberculosis it is not always possible to obtain a positive sputum until some time has elapsed.



Fig. 1 Fig. 2 Fig. 3

Fig. 1.—Note the moderate-sized thick-walled tuberculous cavity in the right lower lobe, situated just above the diaphragm. The remainder of lung is free from disease and the left lung appears healthy. Sputum, Gaffky 5. Fig. 2.—Right lower lobe, cylindrical and saccular bronchiectasis. Lower lobe bronchus injected with lipiodol. The triangular opacity occupying the lower and inner third of lung field is the so-called "basal triangular shadow" representing an atelectasis. On the original film the dilated lower lobe bronchi in this area could be seen. Fig. 3.—A fibrin body in the right pleural cavity. These occur in patients who have been receiving pneumothorax complicated by pleural effusion. They are usually rounded and smooth, lying free on the diaphragm or attached at one end to the visceral or parietal pleura. They contain microscopically a central nucleus of dense compact fibrin formed by blood, pleural effusion, or combination of the two. Our incidence has been one in three hundred pneumothorax cases studied.

Acute lobar pneumonia.—It is not the purpose of this paper to discuss the roentgenological appearance of this disease, for we do not see many typical cases, except in general hospitals. The clinical findings are self-evident; and, commonly, it is only when complications develop or an empyema is suspected that an x-ray study is made. A pneumonic process may take any of three possible courses; the exudate may be resorbed and recovery ensue; the exudate may be organized with the development of fibrotic changes; or suppuration may occur. If either of these two latter possibilities ensue, chronic terminal conditions may be expected, which may take the form of bronchiectasis, abscess, or fibrosis, massive or diffuse in type. Follow-up x-ray studies of the slowly resolving pneumonic process will throw considerable light on the incidence of such terminal conditions and afford more accurate prognosis.

Bronchiectasis, one of the most basal lesions, presents a characteristic appearance. Prior to the development of lipiodol by Lafay, Sicard and Forestier[3] in 1926 the diagnosis was made in 50 to 60 per cent of the cases, and was possible only when the clinical history of an etiological factor, profuse expectoration and certain characteristic changes at one or both bases, presented.

The universal use of one or other of the diagnostic oils now on the market leaves little room for doubt, but there is one point I wish to bring up for discussion, that is: What constitutes first-stage bronchiectasis? Are we to regard the slightly dilated larger branches as evidence of a chronic bronchiectasis? I have found a close connection between chronic

bronchitis, clinically diagnosed as such, and bilaterally dilated lower lobe trunks that do not lose their calibre as they approach the middle and outer zones of the lung field, suggesting that the lipiodol findings of early bronchiectasis and bronchitis are similar.

STUDY OF 100 CASES INVESTIGATED WITH OPAQUE OIL

TABLE I.

Normal bronchial tree	57
Suspected early bronchiectasis	2
Chronic bronchitis	10

TABLE II.

Of the 31 cases positive for bronchiectasis:	
Unilateral	25
Bilateral	6

TABLE III.

Location of lesion in unilateral cases:	
Right lung	10
Left lung	15

TABLE IV.

Lobes of lung involved:	
Upper	4
Middle	3
Lower	24

TABLE V.

Type of dilatation:	
Saccular	15
Cylindrical	10
Mixed cylindrical and saccular	3
Fusiform	1
Isolated cavity	2

In the literature of the past few years, articles have appeared mentioning the significance of the so-called "triangular basal shadows" (Fig. 2). As far back as 1926 Singer and Graham called attention to this condition calling it an atelectatic lower lobe. Sante[4] also refers to it. Richards, of Toronto,[5] says: "In a review of 2,000 consecutive routine chest examinations this finding has been encountered on ten occasions". The same writer, in quoting Kerley's paper, says that a well developed fourth lobe situated at the base of the lung is met with in 15 per cent of normal persons. In my experience I have never found anything but an accessory azygos lobe on autopsy, and I wonder whether the so-called accessory lobe at the base is not a lobular consolidation, pleuritis or localized atelectasis. When a triangular shadow is found a differential diagnosis must be made from mediastinal pleural effusion. This can usually be done by having a postero-anterior film with heavy exposure made, which will demonstrate the small trabeculated honeycombed areas. These can be later demonstrated by lipiodol examinations.

With opaque-oil bronchography it will be noted that the oil is evacuated from the lungs within 24 to 48 hours in the case of frank bronchiectasis: as a matter of fact most of it drains out immediately. In the normal lung the alveoli are filled and absorption takes place slowly. Usually several months will elapse before all traces have disappeared. Occasionally there is a localized reaction from the oil, resembling a bronchiolitis, which is probably due to lymphangitis and lymphadenitis as a result of simple foreign-body reaction. The similarity of the roentgen appearance of lipiodol reaction to other pathological processes is often confusing unless the history of the above-noted investigation is known.

Lung abscess. — The changes noted in this condition depend on the stage of the disease. In the acute phase the findings resemble an ordinary pneumonic process, and they cannot be differentiated from this on a single examination. However, on serial films the progress differs somewhat from ordinary pneumonia, in that the opacity becomes denser and tends to become rounded or demarcated at the edges. Cavity formation soon becomes evident: there is something about the appearance of the cavity that is typical; it is like a clear-cut, punched-out area without the usual irregularity of the tuberculous cavity or the dense nodular wall of the necrotic primary carcinoma. The early cavities of tuberculosis are moth-eaten and irregular, due to liquefaction necrosis of confluent tubercles, and situated in the centre of a soft mottling or confluent process. Lung abscesses usually contain fluid, and a shifting level can be demonstrated fluoroscopically. With healing the area of infiltration surrounding the cavity becomes smaller, and not uncommonly only a linear scar remains. When the cavity alone remains, which is rare, it is due to a lobular ectasia in a resolved confluent lobular pneumonia.

If we analyze a sufficiently large number of cases with respect to the localization of the disease, a distinct difference will be found to exist between the acute aspiration or post-operative abscesses and the chronic pneumonic type. The former usually involves the upper lobe or the apex of the lower lobe. In the latter area the position is largely due to the dorsal direction of the posterior branch of the lower lobe bronchus, on each side, affording a sort of

"sink hole", with the patient recumbent. The chronic pneumonic type of abscess usually involves the lower lobe. Localization for surgical treatment, and diagnostic pneumothorax, to determine whether the affected area of lung is adherent, are important.

In the acute stage lung abscess must be differentiated from lower lobe pneumonia. Here the consolidation of pneumonia spreads rapidly, while that of lung abscess spreads slowly, usually requiring weeks. Chronic lung abscess must be differentiated from tuberculous cavities and neoplasm. The history and sputum examination offer assistance. It will be found rather difficult to fill an abscess cavity with opaque oil, but the area can usually be outlined.

Pulmonary carcinoma. — Primary malignant disease of the lung should be included in our differential diagnosis of basal lesions, but it should not be classed as one primarily basal. It is frequently difficult to make a distinction between acute or chronic infective processes and early malignancy. When the textbook appearances of carcinoma do occur the condition is usually well advanced; unfortunately for the patient, that is when most of our cases are first seen.

In his discussion of primary carcinoma Peter Kerley[6] divides the condition into the hilar and pneumonic forms, the latter varying with the lobe or lobes affected. He states that in the case of either the right or the left lower lobe the greater fissure is seen to be nearer the spine in the lateral view. Two opacities are seen in heavy penetration, one attached to and spreading from the hilum, the other, less dense, and covering the affected lobe in all directions. If the vascular markings of the lung are visible in the light peripheral opacity as well as in the dense opacity near the root cancer can be diagnosed with certainty. If there is displacement of the mediastinum to the affected side, especially noted on fluoroscopic examination during respiration, the presence of bronchial stenosis, one of the most common results of carcinoma, may be strongly suspected. Again, we have bronchography with opaque oil to help us demonstrate the presence of bronchial stenosis or complete occlusion.

TECHNIQUE

It would not be fitting to bring this paper to a close without a short reference to the technical aspect of chest radiography. Dr. Ezra Bridge,[7] the Iola Sanatorium, New York, in speaking before the National Tuberculosis Association, has this to say: "The use of high current of the general order of magnitude of 1,000 MA should bring contrast or tissue differentiation near the high point of usefulness; the use of 7 or 8 feet distance reduces distortion to a satisfactory minimum, and an exposure time of 1/30 sec. or less with adults, and 1/60 to 1/120 sec. with children, stops the effect of movement to an extent beyond which little is gained from a practical standpoint unless synchronization is used." This statement seems to demonstrate the fact that distortion and blurring from heart action and arterial pulsations are more prone to occur at the bases of the lungs.

It will be noted fluoroscopically that the lung tissues near the heart tend to follow the movements of the heart itself, but lag behind the more rapid movements. The greatest lung movement is near the apex of the heart and the excursion of the lung tissue at this point appears to be half that of the heart cycle (end of systole and beginning of diastole) the speed of the lung tissue is roughly one-eighth the maximum speed during the heart cycle. MacPhedran and Weyl synchronized the roentgen exposure with the time of minimum movement and the sharpness of detail was increased by half.

In passing, I wish to mention briefly some facts concerning a recent addition to our diagnostic x-ray equipment which has opened up many possibilities and may soon become standard equipment in large chest clinics and hospitals where thoracic surgery is done. Some of you have heard of the intrascope[8] or planigraph of the Siemens-Reiniger Co., Montreal. In brief, it is an instrument for taking x-ray exposures of the chest in thin tissue layers. Its advantage lies in the detection and localization of pulmonary cavities.

In the standard postero-anterior examination of the chest the cardiovascular shadow obscures the lung parenchyma occupying the inferior and medial margin of the left lung, including the retrocardiac area and the paravertebral quarter on both sides. In a surprising number of instances we are checked up by clinicians who with great glee point out signs of cavitation or consolidation in this area noted on clinical examination. The region can be

demonstrated by films in the right and left oblique as well as the true lateral. We usually check up all cases fluoroscopically, and if a lesion is suspected take special films.

SUMMARY AND CONCLUSIONS

1. A brief analysis and differential diagnosis of the common basal pulmonary lesions has been considered.

2. The possibility of error in roentgenological diagnosis is much greater when the lesion shows a basal distribution than when it is confined to the upper areas of the pulmonary field.

3. In the diagnosis of basal tuberculosis a guarded opinion should be given, and a correlation of clinical, x-ray, and laboratory findings completed before a final statement is made.

4. As it is the custom of the internist to observe the progress of the case from day to day, the radiologist should be afforded the opportunity of conducting serial film examinations.

5. The radiologist must increasingly develop his abilities to the point that he will enjoy, as a consultant, the confidence of his colleagues and the public. Cooperation is essential today as never before in order to further the aims of medical science, namely, the alleviation of suffering and prolongation of life.

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THE MANAGEMENT OF ŒSOPHAGEAL DIVERTICULA

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THIS paper will deal only with pulsion diverticula originating at the pharyngo-œsophageal junction.

PATHOLOGICAL ANATOMY

As described by Mayo, these are the result of a hernial protrusion of the pharyngeal mucosa through the triangle of Lannier. This triangle is only present in a small percentage of cases, and results from a degeneration of the oblique fibres of the inferior constrictor muscle as they criss-cross one another to form the posterior raphe. The base of the triangle is formed by the upper constrictor fibres of the œsophagus. Being the result of a degenerative process, they are found almost entirely in elderly patients. The bolus of food, before it is grasped by the œsophageal muscles, is thrown against the posterior pharyngeal wall at this weak point. It is easy to understand, therefore, why a small protrusion of mucosa will gradually develop. As this enlarges it descends into the neck and accumulates other fascial and fibrous coats. In almost all cases it descends on the left side. It lies beneath the thyroid and all its vessels and behind the pre-tracheal layer of fascia, so that it is guided behind the clavicle towards the dome of the pleura and into the posterior mediastinum. When the apex extends below the clavicle it travels toward the midline and descends into the thorax posterior to all the great vessels, including the arch of the aorta. Any descent below this point is blocked by the presence of the bifurcations of the trachea and the pulmonary vessels.

DIAGNOSIS

The diagnosis is comparatively easy. The following points are very suggestive: (*a*) difficulty in swallowing, with audible splashing sounds; (*b*) the almost continuous regurgitation of mouthfuls of undigested food after meals; (*c*) in advanced cases, the feeling of weight in the upper chest, accompanied by burning and pressure symptoms; (*d*) loss of weight occurring in a man without cachexia or loss of appetite; (*e*) when a catheter is passed it nearly always goes into the diverticulum. An x-ray picture is diagnostic, and the lower rounded pouch-like border of the barium shadow is characteristic.

PRE-OPERATIVE TREATMENT

The diverticulum should be washed out, using a catheter and a syringe. Normal saline, boracic, or soda bicarbonate solutions are usually sufficient to remove clinging mucus and render the sac as clean as possible. The capacity can be measured at this time and the diverticulum should not be filled more than three-quarters full of the washing fluid before it is aspirated. It should be washed out from four to six times during the day before operation, and should be aspirated one hour before operation. These patients are usually dehydrated and weakened from loss of food. On this account, 2,000 to 3,000 c.c. of glucose in saline should be given intravenously for a few days before operation.

OPERATIVE MANAGEMENT

These patients are always thin, and for this reason the operator has to be exceedingly careful and realize that he is operating upon a very vulnerable part of the neck. The incision is made from a point three-quarters of an inch above the insertion of the sterno-mastoid upwards along the anterior border of this muscle for a distance of about three and one-half inches. If one is careful the external jugular vein can be spared by drawing it outwards. At the upper end of the incision the descending branches of the transverse cervical nerve will be met and can be retracted upwards. At this point will also be seen the sterno-mastoid branch of the superior thyroid artery, this being a very constant and sizable vessel. The incision is carried down to the deep fascia with the scalpel, and from then onwards blunt dissection should be resorted to. Blunt Mayo scissors can be used to go through this fascia by spreading the blades, and it will be found fairly easy to drop into the space between the great vessels of the neck and the thyroid. The middle and inferior thyroid veins will have to be ligated. The infra-hyoid muscles will be seen stretching between the sternum and the thyroid and hyoid cartilages. The anterior belly of the omo-hyoid will also be encountered and this muscle should be retracted upwards and outwards. This manœuvre enables the operator to open up the deep cervical space with the dome of the pleura on the outside, which can be seen rising and falling. The great arteries and veins of the neck are forward under the sternum and to the inside lie the trachea, the œsophagus, and the bodies of the vertebra. Posteriorly will be seen the necks and bodies of the ribs covered by the intercostal muscles. In this space the diverticulum must lie.

The fingers and a non-toothed finger forceps are the only instruments that should be used at this stage of the operation. There are many layers of fascia, but, being denuded of fat, they are fairly transparent, and after burrowing through a few of these layers one can recognize the diverticulum on account of the white appearance of its surface. The pleura can be seen rising and falling with respiration; the œsophagus is red; the trachea can be recognized by its rings, and one cannot very well mistake the characteristic creamy-white appearance of the surface of the diverticulum. Contrary to the common conception, there are not many large vessels to give trouble in this area. Of course one can feel the arch of the aorta with its large ascending branches, but all manipulation takes place behind these structures in a space commensurate with the size of the existing diverticulum. Unless there has been a great deal of inflammation adhesions are very few, and in the writer's cases there was no trouble with any bleeding due to adhesions. If adhesions are present it is necessary to free the diverticulum by going down posteriorly to its apex and gradually strip it off the anterior structures from below upwards. There is considerable space, and with the aid of proper light any troublesome bleeding can easily be seen. The space permits one to tie off. As the diverticulum is lifted from the bottom of its bed the sympathetic cord may be seen posteriorly, and some very strong thread-like structures will be stripped off the wall with the gauze sponge. It is not advisable to divide these. It is possible that these may be the upper, middle, and deep cervical cardiac nerves which traverse the posterior mediastinum. One must keep in mind the presence of the thoracic duct. This structure lies on the front of the bodies of the vertebra behind the œsophagus, and holds this position until it turns forward about the level of the seventh cervical vertebra to empty into the confluence of the great veins on the left side of the neck. The œsophagus should not be disturbed. Damage may be done to the thoracic duct.

When the diverticulum is lifted up into the neck it is pulled upwards and outwards. All

adhesions can be sponged off with gauze. Several important structures will be found crossing its neck close to the œsophagus, and it is here that great damage can be done, for these structures look very much like simple adhesions. They should be treated with the utmost gentleness and not divided, for in all probability the thoracic duct is embedded in them, along with the inferior thyroid artery and some branches of the recurrent laryngeal nerve. By manipulation it will be found that the apex can be brought behind these structures. The omo-hyoid will also cross the sac, and if this muscle is well developed it may be wise to divide it, but in any event the diverticulum should be brought posteriorly to this muscle.

It must be remembered that the diverticulum consists of an outer layer of fibrous tissue and an inner layer of mucosa. Our one concern should be the prevention of sepsis, which could travel down into the posterior mediastinum and produce death in these elderly patients. It is almost fatal to get sepsis, and, therefore, in grasping the diverticulum no sharp or toothed instruments should be used.

The disposal of the diverticulum is our next concern. If it were possible to diagnose them when quite small, their inversion into the pharynx would occasion little trouble. However, by the time they present themselves most cases have well developed diverticula of various lengths. When the diverticulum is pulled up into a vertical position its orifice into the pharynx is pulled to one side, and the œsophageal orifice assumes its correct position in the midline to receive the food. The diverticulum placed in this position will not fill but will always naturally empty itself. It will also have a tendency to decrease in size when it is not subject to daily filling.

Small diverticula up to three inches in length can be dealt with most simply by suturing them as high as possible beneath the fascia of the left sterno-mastoid muscle. This should be done with a fine suture on an intestinal needle. Care must be taken that only the outer fibrous coat of the diverticulum is pierced, and if there is any doubt that this cannot be accomplished without puncturing the mucosal coat and producing a leak it should not be attempted. If this accident should occur air bubbles will be seen, and it will be necessary to bring it outside, as is done in dealing with a large diverticulum.

The apex of a large diverticulum is encircled with a silk ligature and pulled out through the upper end of the wound as far as possible. This



Fig. 1.—View of a diverticulum 12 days after operation. It originally protruded four inches from the surface but is now shrunk to a hard ball by alcohol dressings and is ready to be cut off. Note the gangrenous apex round which the silk ligature was tied.

Fig. 2.—Oblique view of a diverticulum. Note that it lies behind the aorta and great vessels. The tip approaches the level of the hilum of the lung.

wound should be closed tightly around the neck of the diverticulum but not sutured to it. The end of the silk ligature is sutured to the skin higher up. This fixes the diverticulum in the wound, and in the course of forty-eight hours this wound is sealed off by adhesions and there is no further danger of infection. Alcohol dressings are applied to the protruding diverticulum. This shrinks it to a hard round ball

which may be removed close to the surface of the skin, without anæsthesia, about the eighth to the twelfth day, depending on its size. On account of the thinness of the neck there is a very short tube of diverticulum, not over one and one-half to two inches, extending between the skin and the œsophagus. This is in an emptying position, and in the majority of cases there will be no further trouble when the fistula has healed. It is very exceptional that it is necessary to dissect the mucosa from the fibrous coat and ligate it. The risk of infecting the neck is the objection to this procedure, and simple cauterization with a pure silver nitrate crystal is usually sufficient to heal the fistula. After operation, the patient is put on a light regular diet and the convalescence is usually smooth and rapid.

This simplified manner of dealing with diverticula depends wholly upon the extreme care taken to avoid infection. The following advantages are apparent: one anæsthetic is given; only one opening of the neck is required; there is no necessity for the use of gauze packing; convalescence is short; the wound is usually healed in from 15 to 20 days.

DIAGNOSIS OF SOME MAJOR VASCULAR ACCIDENTS*

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ONLY certain pronounced clinical aspects of interest in diagnosis will be referred to in the vascular conditions selected for this presentation. Spontaneous rupture of the aorta, spontaneous subarachnoid hæmorrhage, and an observation on coronary occlusions will be considered on the basis of a group of cases in each class.

Spontaneous rupture of the aorta.—The distinctive pathological character of the lesion in 4 cases was that the rupture was complete, sudden, and that there was no pre-existing dissecting process destined to produce an aneurysm. Death was not instantaneous in every case. In a dissecting aneurysm the first stage is in reality an incomplete rupture of the wall; the final tear after the aneurysm has formed completes the perforation. The last-stated conditions are not within the meaning of spontaneous rupture of the aorta. There is always some predisposing pathological change that allows for a spontaneous rupture. A normal aorta requires a tremendous internal pressure to produce rupture of its wall, a pressure much greater than can be developed by the cardiovascular dynamics. Usually the conditions which predispose the aortic wall to dissecting aneurysms are the same as those which permit the vessel to suddenly give way in rupture.[1] Underlying factors to both spontaneous ruptures and dissecting aneurysms are either exogenous influences or indigenous changes. To the first belong trauma, tuberculous and abscess erosions; to the second, acute mycosis of the aorta, syphilis, atheroma, stress as in coarctation, and in some cases, as yet undetermined reasons.

The clinical course of one experience was observed continuously for the whole of its duration of twelve hours. The salient points are stated below. The impressions gained in this instance made it possible to suggest a diagnosis in two others before death. These were also later confirmed by autopsy examination. A fourth person was stricken under circumstances which made observations impossible and which hastened his death. This patient collapsed in the midst of an excited crowd entering a place of amusement.

CASE REPORT

A railroad overseer, 48 years old, was suddenly seized at the lunch table with an excruciating, lancinating pain between the shoulders. Within a short time the pain shifted anteriorly and localized substernally. He was seen at home within a few minutes and found in extreme agony, very restless, and covered with cold perspiration. His colour was good; pulse full; heart sounds clear. The general clinical appearance was about the same as in any severe calculus colic. Within one-half hour the pain between the shoulders recurred with such severity and such suddenness that the patient seemed to rebound as if stabbed in the back. Three-quarter grain injections of morphine were required, and at the end of the last injection the patient collapsed. The sudden pallor was extraordinary. With camphor in oil and artificial respiration consciousness returned, the heart sounds became faintly audible, and he was able to point out that the pain shifted to the left chest. Recovery continued and at the end of four

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gular neurological signs such as point to some meningeal irritation or a positive Babinski test, papillœdema and retinal hæmorrhages which seem disconnected, actually prove very important findings when a history is later obtained by further questioning regarding the mode of onset, and a possible clue to the diagnosis is obtained. Wherever there is any suspicion at all this is sufficient excuse for a diagnostic lumbar puncture. The diagnostic tap has not aggravated any of our cases. Repeated spinal drainage as a therapeutic measure is an arbitrary procedure. Certainly where there is increased pressure drainage is indicated. Sprong[6] states that from experimental evidence the rate at which blood-bearing spinal fluid can be withdrawn from the subarachnoid space necessarily is limited to the rate of secretion of fresh fluid. This is far too slow to rival the rapid spontaneous elimination of red cells, so that only a negligible fraction of subarachnoid blood can be removed by repeated withdrawal of spinal fluid by the time fluid clearance takes place. In the traumatic case he states lumbar punctures should be used for diagnosis and reducing abnormal pressure but they are entirely futile as a means of hastening the disappearance of blood from the cerebrospinal fluid. On the whole the same principle holds true in the non-traumatic form. For the relief of meningeal symptoms lumbar puncture should be repeated.

Since the type of cerebrospinal fluid is such a reliable proof some of the following conditions should be recalled. Froin (quoted by Cookson[7]) in 1904 pointed out that the three diagnostic criteria are uniform admixture with blood, failure to clot on standing, and coloration of the fluid remaining when the red cells have sunk to the bottom of the tube. In some cases the fluid does not necessarily appear tinted with blood to the naked eye. The concentration of red cells may be so low that the fluid is perfectly clear and they are only discovered on microscopy. Russel[8] states that there is no doubt that the blood clots normally enough at the site of hæmorrhage, but one must imagine by the time it has permeated down through the interstices of the subarachnoid space to reach the lumbar cord it has become defibrinated. Two or three separate samples drawn off should be compared to exclude the possibility of accidental blood.

Coronary occlusion.—Left-chest pains parallel right lower-quadrant abdominal pain in that the differential diagnosis must yet be made. Pain is only a sign. The former is not synonymous with cardialgia any more than the latter is with appendicitis. Angina pectoris is literally "breast pains". It is convenient and proving reliable for bedside guidance to incorporate the whole gamut of thoracic pains in four distinct groups. To the first and most malignant form belong the acute coronary occlusive processes. The Heberden type, or angina vera, is the second variety and is an old established clinical entity attributable to coronary defects. Then angina pains arise out of various cardiac deficiencies which are not in the category of either of the above, and the terms of atypical or pseudo-angina only allow for an uncertainty which the diagnosis implies. There are simple anginas also induced by ischæmia but not directly coronary in origin. They are the result of an unhealthy state of the myocardium, a toxic substance, or anoxæmia in extreme anæmia. Lastly conditions simulating cardiac pains, but in which the production mechanism does not involve the cardiac neuromuscular pathway, are common, as in dorsal spinal arthritis or intercostal neuralgia. As an aid in diagnosis corresponding clinical symbols are fairly typical. The angina maligna group is clinically characterized by extreme restlessness while the angina vera type comes to a standstill with the attack. With angina simplex the pain is in the form of a præcordial oppression and the counterpart is fatigue or asthenia. In angina similans the superficial hyperæsthesia and inframammary location of the pain is distinctive. Coronary disease is not always a source of trouble to every afflicted individual as post-mortem examinations often show. Rarely grave coronary accidents produce other catastrophic signals in place of pain.[9]

The typical coronary occlusion accident is diagnosed without difficulty. The severity, persistence and the location of pain is characteristic. The patient reacts by shock, restlessness, leucocytosis, fever, local pericardial exudate formation, and distinctive electrocardiographic changes. The blood sedimentation rate also drops. Such events do not recur in the same individual even once again in 50 per cent of all cases, as nearly that many die in the first attack. After recovery, the patient rarely escapes one

of two sequelæ. Either signs of myocardial failure develop or he remains subject to attacks of true angina in variable degrees of severity. In true angina effort or emotion produces a typical acute attack requiring "standstill", often a feeling of impending dissolution, the usual radiation of pain; response to nitroglycerin is with benefit, and the pain is not supposed to have a duration of longer than about one-half hour. It becomes very important to know whether actual occlusion of a coronary vessel has occurred or not. Though both latter types of angina are very serious the distinction is still important. The weight of the difference between the two is equal to the comparative value of a localized impoverished myocardium in the one case as against a complete infarct in the other. Oftentimes the first attack in a true angina is sudden and extremely alarming. If all the data are not available, or were not obtained at the time of the attack, it becomes a matter of speculation later as to whether an occlusion had occurred. Even immediately after an acute anginal attack some doubt may remain. We have come to rely a great deal on an observation where the individual is an habitual smoker (more than two-thirds in our series smoked). After a sudden acute attack of substernal pain, and in general when the clinical course is that of a coronary occlusion the individual finds that he has not smoked or had any desire and even lost the taste for smoking. He resumes this habit as cautiously as he permits himself to exercise. If an individual has had this experience and in other ways the course remains questionable of occlusion this sign is of value when positive. It is equally of value when the patient who smokes has definitely not had this experience. In 23 cases 16 smoked and gave this positive sign; 7 were non-smokers; 8 others died suddenly before this information was available. The inference from the effect of tobacco suggests the question of the incidence of Buerger's thrombo-angiitis obliterans in coronary artery disease. On a percentage basis alone this element is obviously excluded. This phenomenon was dealt with more fully elsewhere.[10] While it may have some biochemical relation to the so-called smoker's angina it is altogether a different and distinctive clinical feature.

SUMMARY

Severe obstinate lancinating interscapular pain was the leading sign in three patients who did not die immediately, out of the four who had spontaneous rupture of the aorta. In these an ante-mortem diagnosis was possible. Where attendant indications of occult bleeding accompany this pain, the combination is practically diagnostic of the condition.

Ordinarily the clinical signs associated with spontaneous subarachnoid hæmorrhage are typical. Difficulties arise when patients are seen some time after the initial stage. Then irregular presenting features are misleading. These were encountered; ecchymosis about the eyes, photophobia, transient unconsciousness, glycosuria, cervical pains and isolated seemingly unrelated neurological signs. The incidence of this condition is more common than generally expected. Recovery in the majority, and repeated hæmorrhage in the same person, is the rule.

The anginal syndrome is divided into four types on the basis of a corresponding clinical and pathological conception. This is proving a reliable plan, and brings order out of our confusion with which we approach this dreaded set of symptoms. A further aid in the differentiation between only two of the four types is noted in those who smoke. When an occlusive process developed it is observed that there is a loss of taste for tobacco, and the smoker automatically breaks with the habit, either permanently or until he is well on to recovery.

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SOME COMPLICATIONS FOLLOWING ABDOMINAL OPERATIONS*

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The "burst abdomen". — This unfortunate complication, known by many names, is always serious and often fatal. It occurs on an average in 2 per cent of all laparotomies and has a mortality of 30 to 35 per cent. While evisceration may follow any type of abdominal operation it is more likely to occur where there is fluid in the abdomen in association with tuberculosis or malignant growths. Mild infection, as from operations on the stomach or intestine, is also a predisposing factor. Gaseous distension, as pointed out by Glasser, is probably the most essential cause. Vomiting and coughing are contributing factors. The only incisions that seem to be exempt from "bursting" are the McBurney, or so-called "gridiron" incision, and the Pfannenstiel. A transverse or oblique, such as the Kocher gall-bladder incision, is much less apt to open than a vertical, and a paramedian less than a midline.

Since using doubled figure-of-eight reinforcing silk worm gut stitches in all laparotomies for the past twenty years no case of evisceration has occurred in my practice, though even with this added precaution the stitches have in three instances cut through the tissues, exposing the viscera beneath. These reinforcing stitches are left *in situ* fourteen days. Should evisceration occur, resuturing with figure-of-eight doubled silk worm gut stitches through all the layers except the peritoneum is in my opinion better than attempting layer suturing, the layers having by this time become fused together (Fig. 1). In slight spreading of the wound adhesive strapping, efficiently applied, may suffice.

Hæmorrhage.—Immediate hæmorrhage is due either to failure to ligate a bleeding point or to the slipping of a ligature after the abdomen is closed. Delayed or reactionary hæmorrhage is due to the rising blood pressure, depressed by the shock of the operation or by the anæsthetic. In this connection one must bear in mind the fall in blood pressure that often accompanies the use of spinal anæsthesia.

In the treatment of post-operative hæmorrhage it is most difficult to decide whether to depend upon medical measures or immediately to reopen the abdomen and search for the bleeding point. The age and general condition of the patient, the amount of blood lost, the accessibility of the bleeding point, and the possibility that it can be located are all factors that aid in arriving at a decision. One would not hesitate to reopen the abdomen in early hæmorrhage following an appendectomy or cholecystectomy where the bleeding vessel would be almost certainly located with a minimum of exploration. On the other

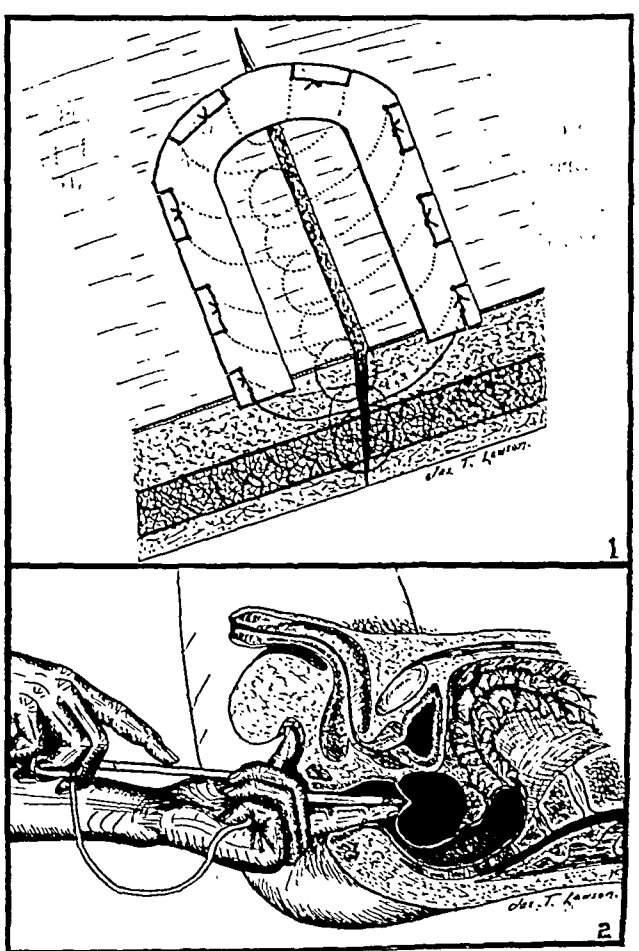


Fig. 1.—Figure-of-eight doubled silk worm gut sutures through all layers except the peritoneum and tied to a Wetherbee plate.

Fig. 2.—Puncturing an abscess in the recto-vesical pouch. A drainage tube may be advantageously inserted but is seldom required.

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Surgery, at Ottawa, June 24, 1937.

hand, one would be loath to open the abdomen after a gastro-enterostomy or a gastric resection. The probable size of the vessel, as indicated by the rapidity with which the symptoms of hæmorrhage increase, will also weigh heavily in the ultimate decision. That is, if the vessel is a large one, such as the left gastric (coronary) or splenic, death will most likely occur before any treatment can be carried out. If the vessel is intermediate in size the patient is so rapidly exsanguinated that nothing more than medical treatment can for the time be considered. Should this be successful in tiding the patient over the crisis no surgical intervention is required. Great care must be exercised not to raise the blood pressure by stimulation or transfusions until such time as the coagulum in the blood vessels has become sufficiently organized not to be dislodged. Bleeding from smaller vessels results in less rapid decline in the patient's general condition, and, therefore, permits of observation and a choice between conservatism and surgical intervention. The wound should be reopened if hæmorrhage persists in spite of medical treatment.

It is a well recognized fact that jaundiced patients run a very great risk of post-operative hæmorrhage. Jaundice produces some change in the chemistry of the blood which is not definitely understood. This change in some way interferes with the arrest of bleeding. The bleeding and clotting time may be normal, and yet the patient may bleed to death within twenty-four or forty-eight hours after the operation.

In a recent case deeply jaundiced from malignant obstruction of the common bile duct I did an external drainage. The icterus index at the time was 192, but during the operation the bleeding was not more than normal. The patient had been given viosterol as a prophylactic measure. Two months later as a result of drainage the icterus index was 10 and the patient had gained 11 pounds in weight. I again operated to remove the obstruction. This was found to be impossible and a cholecysto-duodenostomy was done. Bleeding this time was more troublesome. Viosterol had not been given since the first operation. All went well until the eighth day after operation when bleeding from the wound began. The wound was partly opened and packed with adrenalin-soaked gauze. Bleeding persisted and the wound was re-packed with gauze saturated with adrenalin and Tr. Ferri Perchloridi. Her blood pressure being 82/42 and pulse almost imperceptible, feet and hands cold, a transfusion was given, but the oozing still continued. A dose 4/10 of a c.c. of moccasin snake venom was given. Following this, bleeding practically ceased. A second dose was given in 12 hours and a third 24 hours later. Intravenous saline and glucose were administered, care being taken not to raise the blood pressure too rapidly, and the patient, two days previously almost moribund, was back to her former reasonably good post-operative condition. Does it not seem more than a coincidence that the bleeding should have ceased after the first administration of the snake venom?

Secondary hæmorrhage occurs when a vessel gives way as result of infection and is usually seen a week or so after operation. It is a rare occurrence following abdominal operations. The treatment on account of the infection is necessarily medical, unless the infection itself requires surgical intervention. It is obvious that the best treatment of post-operative hæmorrhage is prevention, and time spent in the careful tying of blood vessels, no matter how small, is never wasted.

Post-operative peritonitis. — Post-operative peritonitis should always be preventable in a clean laparotomy. Where infection is already present a minimum of manipulation and a maximum of respect for existing barriers will reduce to the lowest possible level the risk of spreading infection. Judicious selection of the optimum time for operation in late cases of appendicitis, cholecystitis, etc., will further lower the incidence of peritonitis. Pre-operative vaccination of the peritoneal cavity has proved to be of definite value in the prevention of peritonitis following colon and rectal operations. The usual treatment after any abdominal operation, namely, morphine to relieve pain and ensure rest, gastric suction for persistent nausea and vomiting, normal saline solution and glucose intravenously, is, fortunately, the treatment of peritonitis in its earliest stage. The Fowler position should be used in every case of suspected peritoneal infection. The abdomen should not be reopened unless there is positive evidence of leakage of infective material into the peritoneal cavity. Gastric suction must be continued till the return

becomes clear. The patient must drink water freely and when the return is clear the tube should be clamped for variable periods. A sign of improvement is when intake exceeds output. Maintain the water, food, and chloride balance with (*a*) normal saline by hypodermoclysis and proctoclysis; (*b*) normal saline with 5 per cent glucose given intravenously (2,000 to 4,000 c.c. every twenty-four hours). After the third day endeavour to move the bowels by large enemas, aided by pitressin. If the enema is not expelled it should be siphoned off. This should be repeated several times in twenty-four hours. My experience with pitressin is too limited to make any dogmatic statement, but on theoretical grounds and some experience it appears to be beneficial. By maintaining the tone of the musculature of the small bowel without at the same time causing active peristalsis accumulation of toxic material is lessened. Should regurgitation persist and enemata prove ineffectual a jejunostomy should be done and the bowel irrigated through the tube with saline solution. Should a localized abscess (subphrenic, subhepatic, or pelvic) develop it must be drained. A large collection in the pelvis rising above the symphysis may be drained through a suprapubic incision. A smaller collection in the cul-de-sac can be most satisfactorily drained per rectum (Fig. 2). At the earliest possible moment the offending organism should be identified and appropriate treatment given. If streptococci predominate the picture para-amino-benzene-sulphonamide should be given; if the *Cl. Welchii,* the appropriate serum is administered. We, as surgeons, welcome these adjuvants in the treatment of peritonitis.

Acute post-operative intestinal obstruction.—Acute intestinal obstruction occurring during the late post-operative period offers no special problem other than that of intestinal obstruction generally and needs no discussion here. Acute intestinal obstruction developing soon after a laparotomy, however, presents two difficult problems, namely, one of diagnosis, and one of operative procedure. As the cause of post-operative obstruction is in nearly all cases adhesive peritonitis and kinking there is usually an interval after the operation when the patient's bowels have functioned. Then vague crampy pains, similar to the gas pains from which the patient has so recently recovered, return. Enemas that had proved effectual now produce no result. Vomiting which was controlled has returned. If the patient is still receiving sedatives and hynotics for post-operative pain the symptoms may be so obscure and vague that the surgeon is loath to diagnose so serious a complication as intestinal obstruction, thus resulting in serious delay.

Immediate laparotomy, the rule in early acute intestinal obstruction, seldom applies in acute post-operative obstruction. No matter how early the diagnosis is made the question of operative procedure arises. The patient is recovering from a major abdominal operation and an exploratory laparotomy superadded for adhesions with distended loops of small bowel is often time-consuming and difficult. A fundamental principle of emergent surgery is that expedient, with the minimum of risk, which will tide the patient over the immediate catastrophe. In this particular situation should gastric suction fail to relieve a jejunostomy, with very few exceptions, is the operation of choice. The resulting decompression sometimes allows the intestine to right itself and operation to relieve the obstructing cause may become unnecessary. In some of my cases an enterostomy was all that was done. However, should a residuary obstruction persist when the jejunostomy has had time to function it can then be more safely dealt with. In opening the abdomen for acute intestinal obstruction the surgeon should always have at hand a long rubber tube or, better, a straight glass tube, as advocated by the late Lord Moynihan, for emptying the distended small bowel of its toxic contents. If distension has been relieved by the jejunostomy this procedure may not be called for. It is understood that such well known measures as gastric suction, intravenous salines, and glucose, etc., have been carried out.

Post-operative acute pancreatitis.—This is a rare condition which may follow upper abdominal operations, especially on the biliary tract. It may, however, be a sequel of pelvic operations, especially if a diseased gall bladder has been palpated during the course of such procedures. The onset is usually within a few days of the laparotomy, but in one common-duct case it followed removal of a T-tube some six weeks after operation.

The diagnosis of acute pancreatitis is difficult, especially if this begins in the early post-

operative period. Acute peritonitis, intestinal obstruction, dilatation of the stomach, acute ventricular failure, and even delayed shock have been diagnosed. The clinical picture presented by the patient may simulate very closely any of these entities. Sudden profound collapse, with marked fall of blood pressure, tachycardia, and cold moist extremities have been the outstanding features in two of our cases. Repeated copious vomiting in another case suggested acute dilatation of the stomach, and when the patient failed to respond to the standard treatment for this condition we feared we were dealing with high intestinal obstruction. Marked generalized abdominal distension in this and another case further suggested the diagnosis of acute intestinal obstruction. The agonizing pain usually ascribed to acute pancreatitis is often missing, or perhaps masked by the post-operative distress already present and by narcotics used to relieve pain.

A jejunostomy was done in one of our cases, the diagnosis being intestinal obstruction. This gave definite relief for a time, though the patient finally succumbed. The post-mortem showed complete gangrene of the pancreas. If the diagnosis of hæmorrhagic or gangrenous pancreatitis can be made with a degree of certainty a retro-peritoneal approach, established by an incision made in the left flank, is indicated, the gangrenous material being scooped out with the hand and a large drainage tube inserted. From conditions seen at post-mortem this seems a logical treatment in acute gangrenous pancreatitis, and may save a percentage by an incision made in the left flank, is in- of these otherwise fatal cases. This step should only be considered when the patient has fully recovered from the initial shock and is in a condition to withstand a further formidable operation.

THE VALUE OF MAPHARSEN IN THE TREATMENT OF CONGENITAL SYPHILIS*

BY EDWARD A. MORGAN

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THE arsenical compound, meta-amino-para-hydroxy-phenylarsine oxide, commonly called "mapharsen", is not a recent discovery. It was evolved by Ehrlich and his associates, and recognized by them as a powerful spirochæticide but discarded because of its toxicity. It is believed to be the active principal of salvarsan, being produced from the latter *in vitro* by simple oxidation. It is probable that after an intravenous injection of salvarsan the drug is oxidized in the body and the mapharsen formed is the only fraction of the original compound possessing any bactericidal action. The remaining chemical compounds formed, particularly arseno-oxide, are thought to be responsible for the severe, immediate or nitritoid reactions which occur in some cases. Whether this is the true explanation of these reactions is still a question, but it is certainly true that a typical nitritoid reaction is rarely if ever seen after an intravenous injection of mapharsan.

In the last few years interest in the drug has been revived by positive evidence of its value as a spirochæticide in experimental diseases such as trypanasomiasis, and more recently favourable reports have appeared in the literature following its use in the treatment of acquired syphilis of adults and of Vincent's angina. The consensus is that the drug is easy of administration, its use is not attended by any serious reactions, and the clinical manifestations of syphilis disappear quickly. As to its ability to reverse the Wassermann reaction opinions are somewhat divided.

To fix by clinical observation the value of one arsenical as compared to another is not easy. By the "value" of the drug I am referring only to its effect on the Wassermann reaction. I am convinced that a true estimate cannot be made in congenital syphilis at any rate unless the drug is used for a minimum

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of five years. The age of the patients, the degree of regularity of treatments, and the employment of other medication used in conjunction with the arsenical compound, all tend to increase the difficulty. In the clinic at the Hospital for Sick Children the same routine of treatment has been employed for eighteen years. This is briefly: one intravenous injection of an arsenical compound, once a week for six weeks; mercury by inunction and mouth for six weeks, followed by a Wassermann test. This constitutes one course of treatment, and is repeated over and over again without rest periods. If, then, a new arsenical is introduced in a series of cases some estimate of its value may be obtained by comparison with a similar group of cases in previous years, since the only difference in the type of treatment is the variety of arsenical compound used. An accurate comparison on this basis was, however, not so easy as it sounded, due to the fact that many of our mapharsen patients had received previous treatment by other arsenicals for periods varying from one to five years.

In all, 72 children were given mapharsen treatment but in 32 of these the injections were discontinued because of reactions. These reactions, as will be shown later, were found to be due to inaccurate dosage rather than to any fault of the drug, and when later a proper standard for treatment was adhered to many of these patients were placed again on the list, but up to the time of writing this report they had not received sufficient treatment to warrant including them in the statistics.

THE RESULTS OF TREATMENT

The remaining 40 children were, with one exception, over 5 years of age, and were thus in the so-called late stage of congenital syphilis. One infant treated at four months of age became Wassermann-negative in five months. This is two and one-half months earlier than the average time required when using other arsenical compounds, and which was established by a statistical study of this clinic covering a period of 12 years.[1] In 8, or 20 per cent, of the remaining 39 the Wassermann reaction was reversed from 4 plus to negative in an average period of treatment of ten months. In 15, or 38 per cent, the Wassermann test was changed from 4 plus to 3 plus, 2 plus or 1 plus, in an average time of 14 months.

In the last statistical study of the clinic[1] it was found that of the group in the late stage 49 per cent were cured and 20 per cent improved. It must be remembered, however, that in this study the patients had been under continuous treatment for periods up to as long as twelve years, and the time factor as well as the persistent treatment was responsible for the number of negative Wassermann reactions. In the present series of cases, using mapharsen, no child has been treated for more than 16 months, and I feel that the figures 20 per cent cured and 38 per cent improved constitute an excellent showing for the drug. With continuation of the use of the compound for a further period of three to four years, a more reliable and accurate estimate of its value will be possible. In Table I the comparative figures for the three treatment periods are shown more clearly.

TABLE I.

	Number of cases in late stage	*Percentage cured*	*Percentage improved*	*Percentage unimproved*	*Time required for negative Wassermann*
Summary, 12 years after clinic started	162	49.0	20.0	31.0	28 months
Summary, 4 years after clinic started	66	24.2	24.2	51.6	16.5 months
Mapharsen series, treated only 16 mos.	39	20.0	38.0	42.0	10 months

REACTIONS

It is important when treating children to select a drug which causes as little systemic reaction as possible. An adult will suffer without complaining distressing reactions during his course of treatment, but the same adult will refuse to bring his child to be subjected to the same unpleasant effects. The number and severity of reactions were therefore carefully noted during the use of mapharsan.

In all, 935 intravenous injections were given and 133 of these were attended by some reaction. In only one of the 133 was there an immediate reaction, and this was not of the true nitritoid variety, there being no suffusion of the superficial capillaries and no feeling of

suffocation. One child developed a slight degree of jaundice which cleared in three weeks. All the other reactions were mild, occurred about one and a half hours after injection and consisted of nausea, vomiting and slight headache, lasting one to two hours. Twenty of the children suffered no reaction even in doses as high as 1 to 1.25 mg. per kilo. Four of the 32 patients in whom the treatment was discontinued proved unusually susceptible, suffering reactions with dosages as low as 0.3 mg. per kilo.

THE STANDARD OF DOSAGE

Reactions were more frequent during the first few months the drug was in use. This was due to the tendency to give too large doses —a tendency developed during the employment of novarsan, which is extremely well tolerated by children in large doses. Experimentation with the patients who reacted, in an endeavour to find the safe maximum dose, led naturally to the establishment of the dose per kilo. of body weight which could be used as a standard for the treatment of children. The standard dosage recommended by the manufacturers is 0.5 mg. per kilo. An analysis of all injections given in the clinic showed that patients were treated using standards varying from 0.3 mg. to 1.5 mg. per kilo.

TABLE II.

Mg. per kilo of body weight	*0.4*	*0.45*	*0.5*	*0.55*	*0.6*	*0.7*	*0.75*	*0.8*	*0.9*	*1*	*1.2*
Total number of doses.	53	78	95	112	226	111	35	68	30	41	86
Number giving reaction.	8	11	2	7	11	8	2	22	13	15	34
Percentage giving reaction.	14.5	11.6	2.1	3.6	5	7.2	6	32.2	43	37	40

The number of injections given according to the various standards is shown in Table II, with the percentage giving reactions in each group.

The moderately high percentage of reactions seen in the first and second columns is probably due to repeated attempts to treat three or four unusually susceptible children. The sudden increase in the percentage of reactions in the column, 0.8 mg. per kilo., is striking and informative. Apparently the ideal standard is from 0.5 mg. to 0.75 mg. per kilo., with an average of 0.6 mg. I would recommend that each new case be started at 0.6 mg. per kilo. and increased fairly quickly to 0.75 mg. After that any increase must be gradual until the tolerance of each patient can be ascertained. Since the drug is not completely eliminated from the body under six days it is unwise and unnecessary to administer more than one dose a week.

CONCLUSIONS

The use of mapharsen in the treatment of congenital syphilis has much to recommend it. The drug is safe and easy to administer. Reactions following its use are mild in character and can be almost completely eliminated by care in adjusting the dose. An analysis of 40 cases treated over a period of 16 months strongly suggests that the drug is a more powerful agent in effecting a serological cure than any other arsenical compound previously used in the clinic.

The clinic proffers its sincere thanks to Parke-Davis & Co., who kindly supplied the mapharsen used in the experiments.

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HÆMOLYTIC STREPTOCOCCUS MENINGITIS: REPORT OF CASE WITH RECOVERY AFTER USE OF PRONTOSIL AND SULFANILAMIDE.—The case of hæmolytic streptococcus meningitis, treated with prontosil and sulphanilamide, that E. D. Anderson cites makes a total of 76 cases with recovery reported in the literature in the last thirty-seven years. In 73 of these cases the treatment consisted of repeated spinal punctures, spinal washings, injections of antistreptococcus serum, blood transfusions or a combination of these methods. There were two cases of particular interest reported in 1936. They offer two new methods of treatment. Walker and King reported a case in which streptococcic meningitis developed after an induced abortion in which both blood and spinal fluid cultures gave a positive growth of hæmolytic streptococci. Transfusions were given daily for ten days with blood taken from donors who had previously had scarlet fever. The patient made an uneventful and fairly rapid recovery. Caussé, Loiseau and Gisselbrecht made the first report in the literature of a case of hæmolytic streptococcus meningitis with recovery after treatment with prontosil. The consensus of all the authors seems to be that prontosil is of value in the treatment of hæmolytic streptococcus infection but apparently has little or no effect on other strains of streptococci or other organisms. Although at first it was thought that the drug should be given intravenously as well as by mouth, it is now generally considered unnecessary to use the intravenous method and it is given intramuscularly and by mouth.—*J. Am. M. Ass.*, 1937, **108**: 1591.

DISTURBANCES OF THE SEBACEOUS GLANDS*

BY W. R. JAFFREY

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THE sebaceous glands are racemose in form and furnish a consistent fatty secretion to anoint the skin and hairs. There are three types—those which are appendages of the hair and its follicle, those which are associated with the lanugo hairs and open directly upon the cutaneous surface, and those which are unassociated with other structures and open directly on the skin surface or glands of the mucous orifices, including the glandulæ odoriferæ of the genitalia. They are halocrine glands and the secretion of fatty material which originates in the cuboidal cells lining the acini is exuded from these cells as they are pushed out of the duct. The amount of oily material that is excreted is a personal characteristic, probably hereditary and the control seems to lie in the endocrine chain balance. It has been suggested that the same substance which stimulates the skin glands in pregnancy, especially the mammary gland, also stimulates the sebaceous glands of the fetus, and the vernix caseosa is the result of this. After birth this stimulus is absent, and during infancy the sebaceous glands are inactive, excepting in rare instances and at most up to five years of age, when we do see scalp seborrhœa in infants. The tendency reappears at puberty and also some senile disturbances manifest reactivity of the sebaceous glands. Mammary gland activity may produce an internal secretion which throws off the balance of sebaceous secretion, and the suggestion that dairy products in the diet as milk, cream, butter and cheese may have some bearing on acne may be well founded on the animal endocrines present from mammary gland activity causing overactivity of sebaceous secretion.

Apart from new growths the most diverse disturbances are seen in asteatosis or xerosis, with deficiency of sebaceous secretion, in xeroderma, where the glands are almost absent, and in seborrhœa oleosa, where the glands are plentiful and hyperactive.

Seborrhœa oleosa.—This condition is evidenced by excessive oil secretion and some hypertrophy of the gland itself, and no inflammation. It produces an oily skin from which droplets of sebum and plugs of inspissated sebum can be easily expressed; the hair is oily and there is a tendency to baldness due to the oily layer which dries and coats the scalp and plugs the hair follicles.

Seborrhœa sicca, pityriasis simplex, or *dandruff,* produces on the scalp a fine, branny, slightly greasy, white or greyish scale which falls over the body when the hair is brushed. The scales may be adherent to the scalp or laminated. The hairs become dry and lustreless due to the manner in which the oil dries into scales instead of acting normally as a lubricant. The scalp beneath the dried scales or crusts is of a lustreless, slate-grey colour, and the condition may spread to involve the face, neck, ears, eyebrows, chest, pubes, etc., with some inflammation on these areas. The hair follicles show some atrophy and little if any inflammatory evidences.

Seborrhœic dermatitis.—This condition arises from a seborrhœa on which inflammation is implanted, and the microscopic picture is very much like psoriasis, but the pegs are flatter and the infiltrate is more lymphocytic. The cause is an infective one, the organism known by the designations of various investigators as the spore of Malassez, Unna's bottle bacillus, *Pityrosporum ovale,* etc., finding its proper medium in the seborrhœal secretion and an enzyme or proper acid-base reaction. Cultural and inoculation experiments are not completely conclusive, chiefly because "takes" are obtained but do not persist like the disease itself. This condition usually begins in the scalp and may also involve the ears, temples, forehead, neck and adjacent parts. It may appear on any part of the body and spread by contiguity, but is most common on the chest, back, umbilical and in-

* A paper read at the Sixty-eighth Annual Meeting, Canadian Medical Association, Section of Dermatology, Ottawa, June 23, 1937.

guino-scrotal regions and the axillæ where the sebaceous glands are large and numerous. A soft, greasy, yellow-brown scale or crust is characteristic, in contradistinction to the micaceous scale of psoriasis.

Other disturbances of the sebaceous glands are *milium* or small cysts in the layers of the epidermis containing inspissated sebaceous material, as in Fordyce's disease. *Steatoma,* or wens, or sebaceous cysts, are sebaceous material in a fibrous capsule or retention cysts, and probably dermoids from embryonic remnants in the skin. They have a familial incidence and are usually beneath the epidermis. Nævi of the sebaceous glands also occur.

Comedones are collections of sebaceous material retained in the excretory duct of the hair follicle or sebaceous gland which is greatly distended. There may be no inflammatory element and sluggishness of the sebaceous mechanism promotes the condition. They may occur in very young babies, usually males, and in very old people, although puberty shows the most frequent occurrence.

Demodex infection is caused by a parasite which is present on the skin. In some, scaly patches simulate tinea circinata, and may enter the duct and grow there with no surface manifestation. When pressed out a torpedo-shaped shiny mass presents, which microscopically shows the *Demodex folliculorum.* This condition may accompany comedones and simulate acne when an inflammatory reaction results from the parasitic inflammation and bacterial invasion. It is important to differentiate this condition, as it requires special treatment.

Acne.—This inflammation of the sebaceous glands accompanies oily seborrhœa and comedones, and produces papules, nodules, pustules and extensive induration. This may be followed by deep fibrous nodules, scars, and even keloids, especially in the negro. The face, neck and back are most often involved. The usual age incidence is 12 to 20 years, and it also occurs in very young infants, mostly males, and nearly always in breast-fed infants. The acne bacillus is found on culture associated with the staphylococcus, although some very severe cases give sterile cultures. These patients usually have a bad sugar tolerance and are of the hypothyroid type, and gonadal disturbances are frequent. The halogens are the cause of some follicular eruptions for several reasons; the rich blood supply around the follicles; their secretion or excretion through the sebaceous glands; their special injurious affinity for the sebaceous glands. Halogen influence is commonly encountered in acne and rosacea even from the iodine present in iodized salt, which contains about ten times the dose needed for the prevention of goitre. It also manifests itself in other dermatoses. External application of halogens disturb the sebaceous glands, as seen in chlor-acne, as evidenced by the acne of halowax in industrial use.

The use of the hormone APL to adjust a dysfunction has been suggested, but practically no beneficial result has been obtained in a series of cases of very severe type which we have treated. The use of staphylococcus toxoid is beneficial in the cases where the bacterial infection is unusually prominent.

Acne rosacea is a chronic inflammatory disease of the flush areas of the face, the nose, cheeks and malar eminences, forehead and chin being the order of involvement. The basis of the condition is a vascular congestion which is the first symptom to appear and the last to leave as the disease recedes. This vascular reaction is followed by a low-grade inflammation of the skin and sebaceous glands, with an ulceration of almost trophic character. There are no accompanying comedones. Later, hypertrophy of the skin and glands, increase of fibrous tissue, and marked telangiectasia appear, and, as the condition recedes, scarring. Marked hypertrophy is termed *rhinophyma* and most often occurs in males. Rosacea occurs most often in females, the average age incidence being about 35 years, although an acne developing after 20 years of age should be checked carefully as to history. The chief clinical disturbances found in acne rosacea are mental irritability and perverted fatigue, digestive disturbances, usually characterized by hypoacidity associated with indigestion, gall-bladder disease or chronic appendicitis. and hypothyroid characteristics. Disturbances of uterine function are very often present.

Treatment is based on these clinical factors and the chronic inflammatory granulomatous pathological picture which is shown by the microscope. The use of x-ray to inhibit the glandular action and melt the granuloma in both acne and rosacea teaches us some lessons. It has been noted that if one side of the face of a

patient having acne on both cheeks is treated with x-ray both sides improve alike, suggesting the effect of the ray on the gland having other than local action. Sun sensitivity is a characteristic of nearly all rosaceas, and the longer rays of the x-ray irritate, as do the short ultraviolet rays of the sun; during treatment with x-ray it may be partly the desensitizing effect which is therapeutic. This is very noticeable in some cases, and the first few treatments exacerbate the condition in a sun-sensitive patient. As they recover from the reaction they also can be exposed to the sun's rays without the reaction they previously had.

The sebaceous glands are subject to undersecretion, oversecretion, sluggish mechanism, parasitic involvement, bacterial infection and pathological changes incidental to vascular changes. The sluggishness, bacterial infection, and congestive changes are all very closely associated with disturbances of the endocrine chain. Some points are of special interest. These reactions are rarely seen in cases of definitely hyperthyroid disease. They are common in hypothyroid types. They are associated with sugar intolerance and hypoacidity. Iodine administration may cause inflammatory reactions around the sebaceous glands, as in iodide acne, or may exacerbate one already there. This is probably due to irritation by the halogen on the structure of the gland, either indirectly by its action on the sympathetic nervous system or directly on some one of the endocrine chain. The excretion of the iodine by the gland may be an important factor. The sluggishness of the glands tending to congestion and bacterial invasion is seen during the age of gonadal activity, and is directly due to an action, whether it be depressor or excitor, on the sebaceous gland, and it may be that the sebaceous gland has an internal secretion as well as an external, or the effect may be purely against the gland itself. The reaction present in acne rosacea is entirely different, being vascular in character. But it is the sebaceous gland that is involved, and again we have an age incidence occurring in the 35- to 40-year period where we have another cycle taking place in the gonads of the opposite character to that of puberty.

CONCLUSION

It seems probable that all the disturbances of the sebaceous mechanism and the inflammatory changes in the sebaceous glands are coincidental with the endocrine chain disturbances, chiefly when the gonads, the thyroid, and the anterior pituitary are upset in their function.

It is very possible that the sebaceous glands themselves have an internal secretion which figures in the upset, and all treatment has to be along physiological lines, to balance up these endocrines or await their balance. In the meantime we endeavour to inhibit the secreting action of these glands in those diseases where it is in excess, and use local measures to keep them cleansed and infection-free.

Case Reports

A CASE OF STRANGULATED OVARIAN DERMOID CYST IN A CHILD

BY P. H. T. THORLAKSON, M.D.

Winnipeg

N.B., a girl of six and a half years, was admitted to the surgical ward of the Winnipeg General Hospital on August 21, 1937, suffering from excruciating pain in the left lower quadrant of the abdomen. The child had gone to bed the previous night in good health and had wakened in the morning with crampy lower abdominal pain, which did not radiate. The pain was intermittent in character, returning approximately every two or three minutes, but at no time had she experienced complete relief between the attacks of severe pain. She had vomited once during the morning. At the height of pain the child would scream, sit up in bed and was obviously in extreme agony. She had symptoms for five hours prior to her admittance to the hospital. Her bowels had moved and no blood had been noted. The parents stated that the patient had similar attacks on several occasions during the past three or four months. These attacks had been milder and had lasted only an hour or two. Apart from this there was nothing significant in her past history.

Physical examination.—There were no abnormal findings in the examination, apart from the abdominal and rectal examination. Temperature, 97.4° F.; pulse, 75; respirations, 24; leucocyte count, 11,000; urinalysis, negative. The entire abdomen was held rigid, but extreme tenderness and maximum rigidity were elicited in the lower left quadrant. The slightest pressure in this region aggravated the pain. A rectal examination revealed a mass situated in the centre of the pelvis. This was firm and could be moved slightly from side to side. In position, size and consistency it felt very much like a normal adult uterus.

In considering the differential diagnosis acute intussusception, volvulus of the sigmoid, acute appendicitis (pelvic), and Meckel's diverticulitis were considered, but none of these diagnoses could be reconciled completely with the history or the physical findings. Obviously the patient's condition was growing worse and an operation was advised.

Operation.—A left lower para-median incision was made, and a blackish-blue twisted left ovarian cyst was found, the size of a tangerine orange, which included the left tube. A left salpingo-oöphorectomy was performed. The appendix was also removed.

Pathological report.—Strangulated ovarian dermoid cyst.

A CASE OF LARVA MIGRANS

By A. E. McGavin

Carman, Man.

On July 31, 1937, a boy 6 years of age was brought to me with an abrasion at the tip of the left elbow, which had been caused about four days previously. Two days previously the parents had noticed a pinkish thread-like streak in the skin extending from the point of the elbow towards the bend of the elbow. This streak advanced in irregular loops and curves and at one place a circle had formed with several turns within it. I had never seen a similar case but it suggested to me the appearance of filariasis of the skin. I looked up the description of creeping eruption described in the textbooks, and found that it is caused by a larva which wanders irregularly within the deeper layers of the skin. It is identified as the larva of a dipterous insect—order Estridæ, genus Gastrophilus. It is a comparatively rare condition in northern districts but quite common in warm climates, especially along the Florida coast of the Gulf of Mexico. One case was reported a few years ago in Manitoba and two in North Dakota. There is a possibility that my case originated in the Gulf of Mexico as the boy's grandmother spent the winter of 1936-37 in Florida and other southern places, and brought back quite a collection of sea shells. The grandson frequently played with these shells, and may have been infected with the larva from that source when there was an open abrasion on the elbow. It is reported that a number of cases originated while the patients were staying at the sea shore.

The larva may continue to wander about for weeks or months and advances about one to six inches daily in irregular curves, loops, spirals and circles. It may make many concentric circles.

I thought that a strong exposure of the ultra-violet rays would destroy it, so I administered a five-minute exposure at twelve inches. This had no effect. I then applied a moist 1/2,000 bichloride dressing overnight, with no effect. The books on skin diseases recommended injection of a few drops of chloroform into the skin. I injected novocaine in four places about half an inch on each side of the apparent ending of the pinkish streak, and also half an inch in advance and half an inch behind the point. (The larva is sometimes seen with a magnifying glass as a dark speck 1/3 inch in advance of the pinkish raised line). I then injected a few drops of chloroform within this anæsthetized area. There was no further evidence of the larva. The skin became necrosed where the chloroform was injected and after a time sloughed. It gradually healed by granulation and closing in of new skin. I assisted the growth of new skin by applying a 1 per cent scarlet-pod ointment.

Therapeutics and Pharmacology

HEPARIN AND THROMBOSIS

By C. H. Best, *Toronto*

At the annual meeting of the Royal College of Physicians and Surgeons of Canada, held on October 30, 1937, Dr. D. W. G. Murray and the author presented a summary of their recent work on the effect of heparin on thrombus formation. A preliminary account of this investigation appeared in this *Journal*.[1]

The anticoagulant heparin was discovered in 1916 by Howell and Holt. When the work on this substance was begun in the Department of Physiology of the University of Toronto (1929) it appeared that two problems had to be solved before its effect on thrombus formation in human subjects could be investigated. It was necessary to secure a pure, non-toxic form of heparin and to prove that the anticoagulant prevented the formation of thrombi in experimental animals. The problem of the purification of heparin was attacked by Dr. Arthur Charles and Dr. D. A. Scott in the Connaught Laboratories. Each new preparation of heparin which they prepared was tested on experimental animals, and later some of the purer ones were administered to a group of human subjects. A detailed report of an extended study of the action of heparin on the formation of thrombi in the veins of dogs after injury was recently made by Murray, Jaques, Perrett and Best.[2] The authors conclude that the administration of heparin before and for adequate periods after injury causes a very definite decrease in the incidence of thrombus formation in veins. The injury to the veins was produced in one series of experiments by mechanical means, *i.e.*, crushing, and in another series by the injection of an irritant substance, sodium ricinoleate.

While some of the earlier preparations of partially purified heparin could not safely be administered to human subjects, a solution made from the crystalline barium salt of heparin by Dr. Charles was found to exert no toxic effects. It appeared, therefore, that answers favourable to the exploration of the effect of heparin in the human subject had been obtained in both series of investigations. In other words, a purified, non-toxic preparation of heparin which prevented the formation of thrombi in experimental animals was available.

Quite recently it has been shown by Best, Cowan and MacLean[3] that heparin prevents the formation of white thrombi in monkeys, dogs or cats when blood is made to pass through glass or cellophane tubes. With the help of Dr. James Craigie in making the photographs, a moving picture film in colour depicting the formation of white thrombi has been prepared by Mr. C. R. Cowan and the author. This film was shown at the meeting referred to in the opening paragraph.

While post-operative thrombosis in human

1. Murray, D. W. G., Jaques, L. B., Perrett, T. S. and Best, C. H.: Heparin and vascular occlusion, *Canad. M. Ass. J.*, 1936, **35**: 621.
2. Murray, D. W. G., Jaques, L. B., Perrett, T. S. and Best, C. H.: Heparin and the thrombosis of veins following injury, *Surgery*, 1937, **2**: 163.
3. Best, C. H., Cowan, C. and MacLean, D. L.: In press.

patients constitutes one of the major complications the incidence is happily not great. It will therefore be necessary to administer heparin in a very large number of cases before anything definite can be said about the effect of this material on the frequency of thrombus formation. Heparin has now been administered in the Department of Surgery of the Toronto General Hospital in some 230 cases. Most of these patients had undergone an extensive abdominal operation.

It is thought that heparin may be useful in various operations on blood vessels. Dr. Murray and his colleagues have found it of advantage in doing end-to-end sutures of blood vessels in experimental animals and in the transfer of organs from one site to another. Dr. Murray feels that it may be possible to prevent the formation of a new thrombus after embolectomy by the use of heparin. Encouraging results have been obtained in the clinic in the treatment of certain types of thrombophlebitis, and it is hoped that more of these cases may be studied in the near future.

A great many new problems have been brought to light by the work recently carried out in this field. An effort is being made in the Department of Surgery to detect the cases in which thrombosis is likely to occur, but adequate tests are not as yet available. Further experimental work is being conducted in an effort to determine the rôle of heparin in blood vessel surgery. In the Connaught Laboratories there are many problems associated with the production of heparin in large amounts in a pure form and at a reasonable price. In the Department of Physiology and in the School of Hygiene experimental studies are being conducted by Dr. D. Y. Solandt and the author on the effect of heparin on coronary thrombosis produced in dogs by experimental means. There are many problems, too, in connection with the physiology of the blood platelets.

The clinical investigation of heparin is warranted, first, because it is established that this can be done safely and, secondly, because the results on experimental animals justify the conclusion that heparin prevents the formation of thrombi. While the therapeutic possibilities of heparin are as yet quite unsettled, an effort is being made to advance knowledge in this field.

THE VALUE OF THE ZINC SULPHATE NASAL SPRAY IN THE PROPHYLAXIS OF POLIOMYELITIS

An outbreak of poliomyelitis which occurred in Toronto during the months of August, September, and October, with an incidence rate of 1.1 per 1,000 population, afforded an opportunity for a trial of a nasal spray containing 1 per cent zinc sulphate, 1 per cent Pontocaine, and 0.5 per cent sodium chloride. In the spraying, 0.5 to 1 c.c. of solution was introduced into each naris and the spraying was done on two occasions with an interval of approximately 12 days. The spraying was done according to the technique of Peet, Echols and Richter, but differed from their recommended procedure in that it was not administered on three successive days, since it was considered that it would not be practical to do so. The work was done by the attending otolaryngologists, 44 in number, of eight hospitals in the city. Ninety-seven clinics were held. The staff of each clinic consisted of an otolaryngologist, a graduate nurse as assistant, a clerical assistant for recording the spraying, a public health nurse for recording personal data concerning the child, and an undergraduate nurse for taking the child's temperature. In the period of one week from the authorization of the study, 5,233 children had received the first spraying, indicating the success of the presentation to the public and the efficiency of the organization. The second spraying extended from September 13th to September 16th and supplementary clinics were held on September 20th, a total of 89 clinics being held. The work was conducted without the occurrence of any complications, the immediate after-effects seldom giving discomfort for more than twenty-four hours.

A representative control group of 6,300 children was obtained in the city proper. As suitable control groups could not be obtained in the 12 suburban municipalities, 621 children resident in these municipalities who received the two sprayings in the clinics and 158 in private practice were not included in the analysis. Included in the study, however, were 749 children who were sprayed by the same group of otolaryngologists in their private practice and concerning whom satisfactory data were obtained, making a total of 4,713 children resident in Toronto.

Among the 4,713 children who were sprayed, 11 cases of poliomyelitis occurred to October 12th, 30 days from the second spraying. One of these occurred 6 days after the first spraying and was not included in the analysis. In the control group of 6,300 children, 18 cases occurred during the period. The attack rate in the period 7 days after the first spraying to 10 days after the second spraying was 1.7 per 1,000 in the sprayed group and 2.1 in the control group; in the period 7 days after the first spraying to 20 days after the second spraying, 2.1 in the sprayed group and 2.4 in the control group; and in the period 7 days after the first spraying to 30 days after the second spraying, 2.1 in the sprayed group and 2.9 in the control

group. The differences between the attack rates in the sprayed group and the control group were not statistically significant. In the suburban group, which included 621 children sprayed in the clinics and 158 in private practice, no cases were found to have occurred. In the total of the city and suburban groups the attack rates for the period 7 days after the first spraying to 30 days after the second spraying were 2.9 in the control group and 1.8 in the sprayed group. This difference also was found not to be statistically significant.

CONCLUSIONS

1. This study furnishes no evidence of the protective value of a nasal spray containing 1 per cent zinc sulphate, 1 per cent Pontocaine and 0.5 per cent sodium chloride, when 0.5 to 1 c.c. of the solution was sprayed into each naris on two occasions with an interval of approximately 12 days, the spraying being performed by otolaryngologists with equipment suitable for spraying the olfactory area.

2. As the spraying employing the method used in this study must be conducted by otolaryngologists or other physicians specially trained in intranasal treatment, requires special facilities, and cannot be done sufficiently quickly to meet the emergency of an outbreak, it cannot be considered a practical procedure.

—This summary is abstracted from a paper by Tisdall, F. F., Brown, A., Defries, R. D., Ross, M. A. and Sellers, A. H., *Canad. Pub. Health J.*, 1937.—ED.

Clinical and Laboratory Notes

A TECHNIQUE FOR TREATING FRACTURES OF THE HEAD OF THE FEMUR

BY MALCOLM C. MOONEY, B.A., M.D., C.M.

Jeffery Hale's Hospital, Quebec

The general rules for the treatment of fractures have always been to obtain anatomical and functional alignment, then fix the joints above and below the fracture line. However, the principles of the technique relating to the head of the femur are in distinct contradiction of these established rules. It follows them as far as the reduction of the fracture goes, but there the similarity ceases. Stability of the fractured parts is obtained by fixation to the well limb without regard to the joints above and below the fracture line.

Formerly at the Jeffery Hale's Hospital we had been using the Whitman spica, and though we obtained fair success with a few cases there were too many failures. In addition, there was the discomfort of the patient and the many difficulties of the after-care, well known to all who have used this and similar spicas. In several cases where the spica had not been sufficiently strengthened about the affected hip, moving the patient during the toilet care caused it to crack and lose its efficiency. It was merely to steady the cast at this point that we first employed a bar of wood fixed to the well leg. In this way it was possible to make a lighter cast about the affected hip and still retain sufficient strength to avoid cracking. During a discussion following the application of one such cast it was suggested that the bar could be used for traction counter-traction as well as just for steadying. This was attempted on the next available case and was so successful that we have since been employing it. At present we have 7 successes in 7 living patients, all able to walk about unaided by a cane. This is a small series, but each patient has been so comparatively comfortable and the nursing care so much simplified that we venture to publish the technique. In doing so no claim is made as to its originality, but only that it is a useful modification. The simplicity of its application and necessary equipment merits attention. It can, if necessary, be applied in the home, on an ordinary bed or table, the only requirements being a few assistants, a bar of wood and the usual plaster equipment. Thus it can be of use in isolated districts as well as the hospital.

The principles and the steps of the technique can best be shown by a series of simple diagrams. The patient is placed on a Hawley table, and the feet attached to the foot-extension rods. The legs are further supported by an overhead sling applied about the knee joint. This also allows a slight degree of flexion to be made at this joint. The rod against which the pubes rests prevents the descent of the body. In these cases the only sedative employed was morphine.

Fig. 1.—Shows the patient on the Hawley table with the typical shortening and eversion of the affected limb.

Fig. 2.—The pelvis is fixed by extreme abduction of the well limb, just enough tension being applied to this limb to steady it.

Fig. 3.—The fracture is reduced by abduction, traction and internal rotation, with sufficient traction held to maintain the leg in correct position. Before proceeding further, check x-rays are taken to ensure proper reduction.

Fig. 4.—The well leg is swung over (the tension remaining the same) towards the

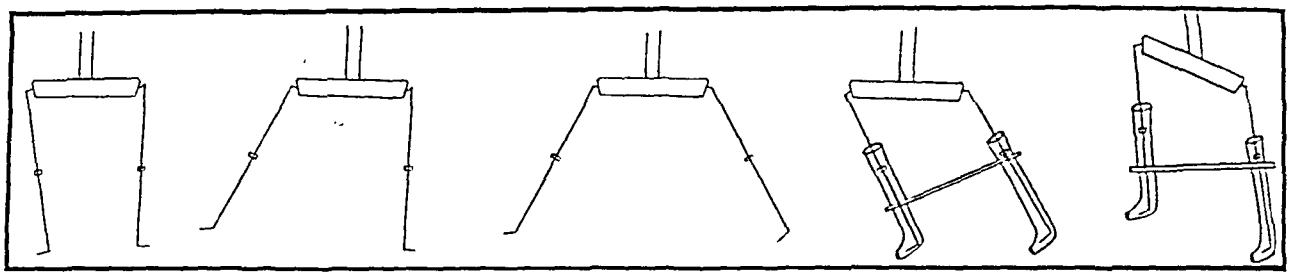


Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5

fractured one until the knees are about eighteen to twenty inches apart. The affected limb remains fixed. Plaster casts are then applied to both legs reaching from about six to eight inches above the patella down to but not including the toes. We found it more comfortable for the patient to place first a longitudinal slab of plaster anteriorly the entire length of the cast before beginning the encircling layers. It is important that the cast be carried down to the toes. In the first two cases we carried them only as far as the malleoli, and the patients complained of pressure on these points. This pressure required cutting away pieces of the cast every few days. Since carrying the casts down to the toes no such complaints have been made. When the casts have partially dried a wooden crossbar is applied a little below the patellæ reaching across the two casts, and held in place with plaster bandage. An ordinary piece of wood, 2" x ¾", and about two feet long, is used. The casts are now allowed to dry and harden. The attachments on the feet are then removed, the legs swung back into the long axis of the body, and the remaining paraphernalia removed. The patient is moved back to his bed.

Fig. 5 shows the final result with the patient lying in bed. The legs have been swung back into the long axis of the body and the resulting tilting of the pelvis is shown. Thus we have the fractured limb in the corrected position held in extension abduction and internal rotation.

As soon as the cast has sufficiently dried it is possible to flex the legs at the hip joint, and by the second or third day the patients are all able to be placed in the full sitting position, or at least half sitting up. The fact that they can be moved in this manner is naturally a boon to the nurses, and a factor in reducing hypostatic congestion of the lungs. That the corrected position is retained was well demonstrated by our third case.

The patient was a labourer, 42 years of age, who developed an alcoholic psychosis on the fourth day, continuing to be delirious for about a week. During this time he managed to get out of bed three times and once even hauled himself on to his feet. On his return to normal we were much relieved when x-ray plates showed the fragments in the same position as before.

Otherwise, the after-care does not differ from other techniques, except that the patients may sit up in a chair after the third week with the plaster-encased legs supported on a stand.

THE EFFECT OF EXTERNAL TEMPERATURE ON SEDIMENTATION

D. B. Rosenthal points out that the profound influence of the external temperature on the blood sedimentation rate has been largely ignored. He floated tubes in conical flasks maintained at temperatures of 40°, 60°, 80°, and 100° F., estimated the sedimentation rate according to Culter's technique, and plotted graphs of the results. He found that the higher the temperature the more rapid the fall within the temperature range indicated. With "slow" blood the difference in the sedimentation index corresponded roughly to the difference in temperature: with "fast" blood the end-point, a measure of cell volume, gave no indication of the effect of temperature on the rate. A mathematical correction for room temperature variation is not yet practicable. Rosenthal emphasizes the need for greater accuracy in recording sedimentation rates, and suggests: (1) that a standard temperature of 68° F. be used, or, if this is impracticable, that the room temperature be included in the report in order to make provision for variations; (2) that the cell volume be recorded. This can be done by centrifuging the tube or immersing it in a water-bath at 100° F. and noting the height of the sediment as a percentage of the total height of the blood column. In "fast" blood the sedimentation index is a measure of the cell volume, not of the sedimentation velocity, and the disparity between the sedimentation index and the cell volume indicates approximately to what extent the former is a measure of the sedimentation velocity. In the absence of any thermometric standards comparison of tests performed at different times on blood from the same source provides no reliable information.—*Med. J. Austral.*, Jan. 30, 1937, p. 172. Abs. in *Brit. M. J.*

Editorial

THE JOURNAL

WITH the advent of a new year and a new volume the *Journal* extends to our readers hearty good wishes for health, wealth and happiness. The Editors wish also to express their appreciation of the many expressions of interest and cooperation which they have received from various quarters. They will strive to make the *Journal* more acceptable than ever.

The year 1938 may prove to be an epoch-making one in the history of the Association. For one thing, we look forward with hope and, indeed with some assurance, to the proposed federation of the various provincial medical societies with the national body becoming an accomplished fact. The auguries are favourable. This means that the *Journal* will have to cater to a larger clientèle and a wider range of tastes. To meet the new conditions adequately the *Journal* will need the aid of all our members.

Then, this year will see the inception of a national Society for the Control of Cancer. Doctor McEachern's editorial in this issue gives a statement of the progress achieved thus far.

The Executive of the C.M.A. has approved the proposal to create a Sub-committee of Medical Research under the ægis of the National Research Council of Canada. It is hoped that this may be the first step towards the creation of a National Council for Medical Research in Canada.

The Canadian Medical Association has been invited to "sit in" at the meetings of the Rowell Commission, and will do so at the appropriate times through its officers. Thus it will have an opportunity to present the views of the profession on such matters as a national scheme for health insurance in Canada, the relationships between the provincial and federal departments of health, and the remuneration of the medical profession for the medical care of the indigent. It may be remarked in passing that the Rowell Commission is the first commission ever appointed in Canada to deal with questions on a nation-wide basis. It is hoped that its deliberations will lead to the establishment of much-needed advances. Further on these topics can be found in this issue under "Association Notes".

The Editors have endeavoured to put out a well-balanced journal, one that presents the best products of Canadian research and at the same time offers papers of practical clinical value. It is too much to hope that any one person will read the *Journal* from cover to cover, though we venture to think that this feat would be worth while; probably, only the Editor-in-Chief has the time and the necessity to do this! It may even be that few of the articles are read in their entirety; hence a summary at the end of the article meets a need. However, the Editors will think they have succeeded well if they produce a journal which the individual member will pick up with the feeling, "Here I am sure to find something to interest me."

For some time each issue of the *Journal* has contained some article of a research character. This, we think, is good policy. If such articles are refused the authors must, perforce, turn to other journals, and, so, much of the credit which should go to Canada is diverted to other countries. It may be remarked in this connection that with few exceptions the research papers that have been published have had a practical bearing or have announced some important discovery. There is much need for a special journal or journals to take care of such.

Nevertheless, we shall endeavour to meet the needs of the general practitioner more fully than before A new Section entitled "Therapeutics and Pharmacology" has been established which will offer helpful suggestions and will bring before our readers the latest and best in diagnosis and treatment. The items in this section will be brief, written by men who are well qualified to express opinions.

In the future the Editors will be obliged to refuse papers of inordinate length, no matter how good, except under extraordinary circumstances. Long papers are re-

pellent and, it is safe to say, in most cases not read. They are put aside for that "more convenient" season which never comes. A manuscript of fifteen quarto pages of typescript, *double-spaced*, is of a desirable length. Contributors will aid greatly if they will list their references according to the rules of the *Journal*. References should also be checked before the papers are sent in; not infrequently we find serious errors therein. An incorrect reference is worse than useless; it is misleading.

Members can contribute to the popularity of the *Journal* by sending in *brief* notes on interesting cases thay have met, citing the salient clinical features, with the treatment adopted, and giving the result. One page of the *Journal* or less is a suitable length. Rare cases are interesting and, of course, should be reported, but everyday experiences are more generally helpful.

Our readers, also, should use our Section of "Letters, Notes and Queries". Here they can ask questions, express their ideas, and even criticize opinions advanced in the published papers. A good controversy, if courteously carried on, is always readable, and, usually, illuminating.

The Editorial Committee on Advertising continues to give careful thought to this difficult subject. Most advertising matter contains an element of exaggeration, for no concern is content to cry "stinking fish". Advertisements may be divided into three classes—true, false, and half-true. The first and second are easily dealt with. The third always gives trouble, for here it is difficult to check up on the statements, as the Association has no department of research on these matters to which the *Journal* can turn. We have largely to follow the practice of other reputable journals. We do reject, however, much advertising matter that is offered and make representations to the advertisers in cases where we think their statements require modification or excision. Fortunately, our advertisers realize that, to be effective, their matter must not offend the scientific sense of our readers, and have been willing to accept our suggestions in a cooperative spirit. In all this, however, it must be remembered that in the case of a journal such as ours the advertising pays the bills and we have to exercise discretion. Ruthless pruning methods are hardly possible in these days. We are doing our best.

Let us all work for the good of the *Journal*.

A G.N.

THE CANADIAN CAMPAIGN AGAINST CANCER

AT its annual meeting in Ottawa in June the Canadian Medical Association decided to take the initiative in organizing the people of Canada in a campaign against cancer. This step was taken with the approval of the Trustees of the "King George V Silver Jubilee Cancer Fund for Canada." The Association appointed a committee, with power to act, and instructed it to proceed with the work of organization. This was done in accordance with plans of which the details appear in the Report of Council for 1937. One of these required that within the Canadian Medical Association itself there be established a "Department of Cancer Control". The other outlined the organization of a "Canadian Society for the Control of Cancer" in which membership would be open to all Canadian citizens, and which would invite to become affiliated with it all organized bodies which would volunteer to give to it the aid of their organized strength. The Canadian Medical Association had already committed itself to become affiliated and to place at the disposal of the "Canadian Society for the Control of Cancer", when formed, all of its organized facilities which could be used in the fight against cancer.

The committee began in July by appointing two sub-committees with interlocking personnel in order to ensure close cooperation. The first was responsible for the establishment of the Department of Cancer Control of the Canadian Medical Association; the other was responsible for organizing the Canadian Society for the Control of Cancer. Each of these sub-committees has utilized and secured the enthusiastic cooperation of every province in which the profession

has organized itself into a Provincial Medical Association with constituent district and local medical societies.

The organization of the Department of Cancer Control has already progressed to a stage where Cancer Study Committees are being formed in hospitals of the one hundred bed minimum capacity. In one province this part of the organization has been completed. In at least three other provinces the work has progressed so far that it will probably be completed by the time this goes to press.

An Authorship Committee has been formed. It is already at work preparing a book on cancer; this will present in concise but comprehensive form the early signs and symptoms of cancer in the various sites. When complete, it will be the result of the collaboration of the physicians and surgeons of the universities of Canada. It is proposed to place a copy in the hands of every Canadian doctor.

The organization of the Canadian Society for the Control of Cancer is necessarily a more difficult task. The sub-committee responsible for this has appointed a Provisional Board of Directors composed of three prominent laymen and three doctors. This Board is proceeding with the work of organization. Already it has taken steps to organize a provincial branch in each province, where a branch or a division of the Canadian Medical Association exists. With this end in view a member of the Provisional Board of Directors recently visited each of the Canadian provinces. In each he conferred with the officers of the Provincial Medical Association. In eight provinces these men are now engaged in securing the consent of active laymen and women to act as the officers of the provincial branch of the Cancer Society.

So soon as provincial branches are organized they will be invited to elect a representative to the Grand Council of the National Society. The Council thus constituted will then convene and constitutionally appoint a Board of Directors which will replace the Provisional Board.

It is hoped that the Society will serve as an agency which will enlighten the Public regarding the early signs and symptoms which may be indicative of cancer and the benefits which result from early recognition and prompt treatment. It should also serve to stimulate those who can afford to do so to make financial contributions which will make it possible to extend aid to research workers.

From time to time readers of the *Journal* will be supplied with detailed information relating to the progress of this work of organization.

J. S. MCEACHERN

Editorial Comments

Vaccination Against Whooping Cough

The somewhat unsatisfactory results of some workers with *H. pertussis* vaccine led the Council of Pharmacy of the American Medical Association to omit this form from the list of "new and unofficial remedies" in 1931. Since this time more favourable results have been reported in children by Madsen in the Faroe Islands, Sauer in Chicago and Kendrick in Grand Rapids. In the last instance, of 1,592 children, 712 vaccinated and 880 controls, 67 cases of whooping cough developed, of which only 4 were in the vaccinated group. To what may one ascribe their apparent success? In each case the vaccines contained 10 billion killed *H. pertussis* per c.c., the organisms having been cultured on some form of Bordet-Gengou medium, enriched in one case with horse, in the second with human, and the third with sheep blood. The bactericidal agents used for killing the organisms were formalin, phenol and merthiolate respectively. Large doses were employed by Sauer and Kendrick and smaller ones by Madsen. One common factor however was the use of "young", "recently isolated" or "phase I" cultures, and it is this that we would like to stress. For the work of Leslie and Gardner, Lawson and Shibley, and Hoelscher has shown that this organism occurs in various phases, or R and S forms if you will. This change from virulence to avirulence seems to occur readily, yet there are apparently no different specific sub-types in the whole group. Can it be that in the vaccines that failed completely virulent forms were not used? So much for the use of vaccines of whole organisms in man.

In animals the most recent experimental work is to be found in a paper by Burnet and

Timmins.[1] They describe a novel method of infecting anæsthetized mice by intranasal instillation of an emulsion of living *H. pertussis*, and in one experiment where a carefully computed infecting dose was employed were able to show definite protection, using a formol-killed vaccine.

Several other vaccines have been described, *i.e.*, Kreuger's extract of *H. pertussis*, the Mulford Laboratories' soluble vaccine, and the Glaxo Laboratories dissolved vaccine. But the most advanced work with a fractional antigen is that of Cruickshank and Freeman.[2] They have succeeded in chemically separating an antigen from cultures of *H. pertussis* which in suitable dosage will protect mice against an intraperitoneal inoculation of this organism lethal for control animals. This work appears to offer high promise, and it is to be hoped will before long be applicable to human beings since whooping cough still ranks among the distressing contagions with disagreeable after-effects. ARNOLD BRANCH

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Proposed Organization of Canadian Physicians Interested in Physical Therapy

Recently a letter was forwarded by Dr. R. B. Taylor, of Montreal, to the Superintendent of each of the hospitals listed by the Department of Hospital Service of the Canadian Medical Association, asking them to pass this letter to the Physician-in-charge of the Department of Physical Therapy of their hospital or to some member of the staff who is interested in the subject, calling attention to the fact that an attempt is being made to organize a Committee on Physical Therapy under the jurisdiction of the Canadian Medical Association.

It is desirable that every physician in Canada who is interested in this subject should have representation in the Councils of the Canadian Medical Association. Physical therapy has become more and more a part of modern medicine. Such an organization will increase the respect of the doctors in Canada for this subject, and in addition will give those interested an opportunity of cooperating with one another in the solution of their problems.

Will every physician who is interested communicate immediately with Dr. Ross B. Taylor, 324 Medical Arts Bldg., Montreal, Que., in order that he may have the necessary data to present to the Executive Committee when they meet in the near future? The assistance of the Council on Physical Therapy of the American Medical Association in the organization of a Committee similar to their own has been assured. If certain hospitals or individuals have been omitted it has been due to lack of addresses. Dr. Taylor will be pleased to hear from all physicians interested in physical therapy. A.G.N.

The Panel System

Dr. W. A. Jones, of Kingston, Ont., writes us in regard to the working of the Panel System in Great Britain. Our General Secretary was in Europe last summer gathering data in regard to this matter and on health insurance generally. He brought back a very complete and illuminating report. But, of course, his information, whether for or against, was derived from local (British) sources. Doctor Jones makes the suggestion that it would be interesting to get the views of Canadian doctors who have worked in Britain under the system, whether as *locum tenentes* or in other capacities. Some of those who have done so have come back to Canada with an unfavourable impression. That there are certain shortcomings in the practical operation of panel practice most would admit, but, no doubt, the merits of the system exceed the demerits. However, we would be glad if any Canadian doctor who has personal knowledge of the operation of the scheme would communicate his views to us through the General Secretary. Let us have the facts. A.G.N.

Dr. Eugene St. Jacques

We learn with pleasure that the Academy of Sciences in Paris has granted the Montyon Prize to Dr. Eugene St. Jacques, Professor of Surgery at the University of Montreal, for his work on the treatment of acute infections by intravenous carbon.

This prize, amounting to fifteen hundred francs, was to be formally conferred at a public meeting of the Academy on Monday, December 20th. We tender Dr. St. Jacques our congratulations on this signal honour. H.E.M.

Retrospect

SOME MEDICAL ASPECTS OF TOBACCO

By W. J. McCormick, M.D.

Toronto

Since the publication of the famous "Counterblaste" by King James 1st of England in 1604 there has been a continuous and voluminous contribution to the world's literature relative to the merits and demerits of tobacco, the latter being greatly in preponderance. Until comparatively recent years most of these diatribes have been based on presumptive rather than scientific evidence. But with the advance of laboratory technique and precision our knowledge of the effect of tobacco on the human organism has taken on a more definitely scientific phase, so that effects that have heretofore been recognized clinically are now confirmed by laboratory findings.

The predominant effects of tobacco have long been regarded as referable to its action on the cardiovascular, digestive and nervous systems. "Tobacco heart" and "smoker's cancer" were, perhaps, among the first clinically noted effects of tobacco.

The prevalence of "tobacco heart" was very noticeable in the medical examination of military recruits for the Great War, the rapid and erratic heart action of heavy smokers being a frequent cause of rejection. The average pulse rate of smokers was found to be considerably faster than that of non-smokers, and a further exacerbation was noted during the act of smoking. In 23 out of 27 subjects Aikman[1] found a marked increase in pulse rate following the smoking of but one cigarette. In 7 of his subjects the increase was less than 8 per minute; in 7 it was 8 to 15 per minute; and in 9 the increase was 15 to 24 per minute, the average increase being 14 beats to the minute. In 10 of his cases the pulse, which had been regular, became irregular after smoking, and in several, markedly so.

A more forceful demonstration of the effect of tobacco on the heart action was recently recorded by Sontag and Wallace[15] in their observation of the effect of maternal smoking on the pre-natal pulse rate. They made 81 recordings of the fetal heart rate in five prospective mothers, before and after the smoking of a cigarette. Four of their subjects were habitual smokers, while the fifth had never smoked previously. The average fetal heart rate prior to maternal smoking was found to be 144 per minute. This in itself is significant in view of the fact that the normal average fetal heart rate is 130, as reported by obstetricians thirty years ago when smoking by women was not in vogue. Within eight to twelve minutes after a cigarette was lighted and smoking begun they found a further average increase in the fetal pulse of five beats to the minute, in spite of the fact that in one of the subjects, the non-smoker, there was an actual decrease in the rate, due perhaps to the fact that she did not inhale and expelled the smoke from her mouth as quickly as possible. To eliminate the possibility of fractional errors in computation a stop watch was used in these tests, the actual time elapsing during the counting of ten beats being recorded, instead of counting the number of beats heard during a given length of time, as is commonly done.

For many years physicians (notably Erb, Buerger and Silbert[14]) who have had an extensive experience with the vascular affection known as thrombo-angiitis obliterans (Buerger's disease), have definitely linked the use of tobacco with this malady as a causal factor. The physiological basis for this relationship seems to have been found recently by a number of laboratory research workers, attacking the problem from different angles. In 1932 Maddock and Coller,[9] by means of delicate skin temperature tests, demonstrated a definite peripheral vasoconstriction following smoking. In a subsequent report they showed that this hypertensive effect was due essentially to the nicotine content of the tobacco smoke. As evidence of this they found that nicotine, injected intravenously in amounts theoretically equivalent to the smoke absorption, produced approximately the same decrease in skin temperature of fingers and toes, and the same increase in blood pressure and pulse rate, as was obtained from smoking. These findings were subsequently confirmed by the work of Barker, and Wright and Moffat,[17] Johnson and Short, and Lampson.[6] The author last mentioned made use of a plethysmograph to register the speed of arterial blood repletion in the hand after application of a constricting band at the wrist to prevent venous return, thus indirectly indicating the degree of vasoconstriction produced. He found that the smoke of a cigarette, when inhaled, produced an immediate and pronounced peripheral vasoconstriction lasting about an hour. When smoked without inhaling the effect was of the same character, but of shorter duration—about a quarter of an hour. Wright and Moffat[17] found that the smoking of a cigarette produced such pronounced vasoconstriction that the skin temperature of the fingers dropped from 1 to 15° F., and the circulation of blood in the small

capillaries of the nail folds, examined microscopically, showed a marked slowing-up, and in some cases a complete stasis.

More recently, Maddock, Malcolm and Coller[10] made further investigation of the cardiovascular effects of tobacco in an effort to determine if there were any special features which might explain the predilection of thrombo-angiitis obliterans for males and for members of the Jewish race. They also investigated the possible relationship of the allergic sensitivity to tobacco and the cardiovascular response to smoking. (Harkavy and his associates and Sulzberger had previously reported that 80 per cent of their cases of Buerger's disease gave a positive allergic skin reaction to tobacco). As to the influence of sex they found that cigarette smoking produced practically the same reduction in peripheral skin temperature and the same increase in blood pressure and heart rate in women as in men. They pointed out, however, the possibility of a sex hormone giving to the female in some way a relative immunity to the cardiovascular effects of tobacco, and referred to the work of McGrath, who found that large doses of theelin prevented the development of gangrene of the tail in female rats following toxic doses of ergotamine, a strong vasoconstrictor. The well recognized greater resistance of the mammalian female to toxines in general may have a bearing on the matter. It should also be noted that the use of tobacco by women is of comparatively recent adoption. As to racial predilection, Maddock and his associates found that smoking produced greater peripheral hypertension in Jewish subjects than in gentiles. Allergic sensitivity to tobacco, however, was found to bear no definite relationship to the cardiovascular effects of smoking. This they accounted for by the possibility that the former may be due to some element in tobacco other than nicotine, whereas the latter is definitely referable to the action of nicotine on the sympathetic nervous system.

In this connection a brief study of the mechanism involved in the cardiovascular effects of tobacco may be of interest. Nicotine, the active alkaloid of tobacco, excites the sympathetic nervous system, resulting in peripheral vasoconstriction and cardiac acceleration. At the same time, through the same mechanism, the emergency action of the adrenal glands is brought into play, releasing adrenalin into the circulation, which reinforces and parallels the effect of sympathetic stimulation. The adrenalin release produces in addition to vasoconstriction a pronounced increase in the blood sugar concentration, owing to its glycolytic action in the liver and muscles, and a noticeable increase in the respiratory quotient; and, as shown by the writer[11] in a previous paper, all these features of the sympathico-adrenal response to nicotine constitute a protective reaction of the organism well adapted to counteract the toxic absorption. It is not difficult, therefore, to visualize the possibility of repeated exaggeration of this protective response, as in tobacco habituation, resulting in organic changes in the peripheral blood vessels of hypersensitive subjects, similar to those of thrombo-angiitis obliterans, brought about, perhaps, as a result of impaired blood supply to the walls of the blood vessels themselves (vasa vasorum), as pointed out by Von Oppel. As aptly stated by White,[16] "If an emergency is too severe or too long continued, the very factors which normally act to preserve the organism may lead to its dissolution".

As corroborative evidence of the tobacco factor in the etiology of Buerger's disease, Friedlander, Silbert and Laskey[4] produced gangrene in the toes of albino rats as a result of intraperitoneal injections of tobacco extract in sub-lethal doses. Of 48 male rats so treated, 33 developed gangrene within 5 to 12 weeks. None of 12 female rats subject to the same treatment developed this lesion in 5 to 18 weeks, again demonstrating the relative immunity of the female. Of 10 control male rats, living under the same conditions, none developed gangrene. Of 6 rats subjected to daily inhalation of tobacco smoke, one male developed lesions identical with those produced by the injections.

In a previous paper on thrombo-angiitis obliterans, Silbert,[14] in recounting his experience with this disease, refers to the rôle of tobacco as follows.

> "The importance of tobacco as the exciting cause of this disease must be stressed. The evidence in support of this contention is overwhelming. In over a thousand instances of this disease studied by the writer a typical case in a non-smoker has never been seen. Cessation of smoking regularly arrests the disease, while continued use of tobacco is coincident with progression. In innumerable instances, patients who have been restored to good condition by treatment and elimination of tobacco have shown recurrence of the trouble when they resumed smoking. In practically all cases of relapse, with ulcer formation, gangrene or amputations, patients have admitted returning to the use of tobacco. In several early cases of the disease, cessation of smoking, without any treatment whatsoever, has resulted in complete disappearance of all symptoms. This regular association of the use of tobacco with the recurrence and progression of the disease is too striking to be ignored. Although a constitutional susceptibility to tobacco must be assumed, the rôle of this agent as the exciting cause cannot be doubted."

Relative to the effect of tobacco on the digestive and respiratory systems, recent work on the cancerogenic properties of certain hydrocarbon distillates seems of interest. It has long been known that workers who handle pitch, and others who are employed in the manufacture of briquets from pitch and coal dust, frequently suffer from skin cancer. Likewise, shale oil workers coming in contact with crude paraffin,

a natural distillation product, and chimney sweeps exposed to soot, a distillation product of coal, are known to be unduly prone to skin cancer. Recently Cook, Hieger, Kennaway and Mayneord, working in England, and Morton, Branch and Clapp,[12] in America, were able to isolate from coal tar certain benzene derivatives, such as benzpyrene, dibenzanthracene and triphenylbenzene, which, when applied to the skin or injected subcutaneously in mice, would produce cancer. This discovery throws new light on the possible rôle of tobacco in the causation of cancer of the lip, mouth, stomach and lungs, affections notably predominant in males, who in smoking expose these parts to the irritant action of the distillation products of tobacco. Thus it seems that certain products of combustion and distillation of the organic matter of the tobacco, aside from the thermal and mechanical irritation associated with smoking, may sensitize the skin and mucous membrane of the respiratory and upper digestive tracts to cancer. In 100 cases of cancer of the mouth reported by Abbe, 10 were in women and 90 in men. Of the 90 men all were heavy smokers, with the exception of one who had cancer of the lip on the site of an old baseball injury. According to Hoffman the death rate from cancer of the lungs has almost trebled since the Great War. Comparing this increase with the parallel increase in tobacco consumption one is led to believe that smoking may be the responsible factor. In reference to this Bogen and Loomis[3] say: "It may be of interest to note in this connection that the only woman with this condition (lung cancer) autopsied at the Olive View Sanitarium (Calif.) gave a history of more than 15 years' excessive smoking of cigarettes".

As to gastric and duodenal ulcer, Ochsner, Gage and Hosoi,[13] in a recent paper on peptic ulcer, submit irrefutable evidence of the causal relation of tobacco. After referring to the observations of others in this respect, they say: "We are so convinced that smoking is detrimental to patients with peptic ulcer that we refuse to treat such an individual unless he will abstain from smoking." In a series of duodenal ulcer cases Gray found that 96 per cent were smokers. He regards tobacco as one of the principal causes of peptic ulcer. Moll and Flint found that smoking increased the secretion of hydrochloric acid in the stomach, a condition conducive to ulceration. Lickint found that smoking decreased the secretion of pepsin and rennin, thereby inhibiting protein digestion. Friedrich believes that cigarettes are specially harmful in this respect, since most cigarette smokers inhale, thereby greatly increasing the absorption of nicotine. He regards the action of nicotine on the stomach as two-fold: first, producing vasospasm in the gastric mucosa, which he was able to observe microscopically; and, secondly, increasing acidity. The former he attributes to the direct action of nicotine on the blood vessels, or to the release of adrenalin as a result of the action of nicotine on the adrenal glands. The vasospasm, by producing ischæmia of the gastro-duodenal mucosa, favours necrosis and ulceration. Eighty per cent of Friedrich's male patients with stomach ulcer were heavy smokers. Of 34 of his patients who smoked heavily after operation, although instructed not to do so, half had recurrence of symptoms; whereas, of 44 who curtailed their smoking, only 6 had mild symptoms. He found smoking particularly injurious in gastro-enterostomy cases. Of 14 such who failed to limit their post-operative smoking only 4 were free from relapse; while of 30 who did reduce their smoking only 4 had a return of symptoms. He cautioned against the practice of smoking before breakfast, when the stomach was void of food which might act as a diluent and neutralizer of the excess acidity produced. In view of the well-recognized fact that cancer not infrequently develops on the site of chronic gastric and intestinal ulcers, smoking may thus be seen as a possible indirect cause of the predominant incidence of this type of cancer in men. According to McNally, in Holland where tobacco consumption is greater than that of any other European country the mortality from cancer of the stomach is almost double that of England.

While nicotine has been generally recognized as the most potent morbific ingredient of tobacco smoke, there are other toxic products of combustion and distillation which must be considered. Carbon monoxide, ammonia, formaldehyde, methylamine, methane, methyl alcohol, hydrogen sulphide, pyridine, furfurol, arsenic, carbolic acid and prussic acid are all recognized constituents of tobacco smoke. Fortunately, however, most of these are present in minute quantities. Carbon monoxide seems to be the major exception. One gram of tobacco when smoked in a cigarette may develop as much as 70 c.c. of this lethal gas, while the same amount smoked in a pipe may produce 105 c.c. Recent research relative to this constituent of tobacco smoke demonstrates its biological potentiality. Ruhl and Lin studied the problem by submitting subjects to varying atmospheric pressure in airtight caissons while smoking. They discovered that a rarefied atmosphere, of decreased oxygen content, facilitated intoxication by tobacco smoke; which would be in harmony with the effects of carbon monoxide. The proportion of this gas in the expired air of smokers is found to vary from 0.025 to 0.03 per cent. Of much greater significance is the degree of its absorption in the blood of the smoker. In 25 subjects who inhaled while smoking, the carbon monoxide content of the blood was found to average 0.1

per cent, with a maximum of 0.7 per cent. In another group of heavy smokers the average was found to be 0.26 per cent. These observations were made in the forenoon, while tests made in the afternoon, after the consumption of a greater amount of tobacco, showed an average of 0.52 per cent, with a maximum of 0.85 per cent. Comparative tests were also made in the same subjects before smoking, while smoking, and after smoking. In one case a pre-smoking percentage of 0.45 rose to 1 during smoking, and fell to 0.75 five minutes afterward. In another case the respective levels were 0.7, 2 and 1.7 per cent under the same conditions. Thus the increase in the blood carbon monoxide during the act of smoking may amount to double or triple the normal level. Since, therefore, it is essential that the oxyhæmoglobin must at all times be adequate to displace the carboxyhæmoglobin, the liability to accidents in aviation referable to smoking in high altitudes may be visualized.

In view of the phenomenal increase in tobacco consumption in recent years it would seem imperative that the medical profession, especially those in public health work, should give greater attention to the possible morbific effects of an agent which laboratory and clinical research has shown to be so potent.

A field which offers special opportunity for investigation is the possible relationship of tobacco habituation to the rapidly increasing incidence of heart disease, especially the sudden seizures in comparatively young and middle-aged men, attributable to coronary thrombosis. The fact that the increase in fatalities from coronary lesions has consistently paralleled the increase in tobacco consumption may not be without significance. It would appear logical to assume that an agent which has shown a definite relationship to the development of thrombosis in other parts of the body may be a contributory or exciting cause of this affection. There are several cardinal features which seem to be common to coronary thrombosis and thrombo-angiitis obliterans: 1st, the greater susceptibility of the male; 2nd, the presenile age group; 3rd, periodic vasospasm, manifested in the former by anginal attacks and in the latter by intermittent claudication and muscular cramps; 4th, organic vascular changes, having their inception in the latter in the vasa vasorum, leading to progressive impairment of function in the vascular musculature proper, while in the former the initial changes occur in the coronary blood vessels, the anatomical counterpart of the vasa vasorum, with secondary changes in the heart muscle; 5th, thrombotic occlusion, leading to gangrene as a final eventuality in thrombo-angiitis obliterans, and to necrosis and infarction in coronary thrombosis when not intercepted by a fatal termination in the initial seizure; 6th, the two affections are not infrequently concomitant. In reference to such cases Lewis says:[5] "It is to be recognized, too, that in these patients tolerance of exercise may be masked by breathlessness or by anginal pain; this, by limiting the exercise taken, will conceal a weakness of the legs, just as, reversely, a severe intermittent claudication may conceal angina of effort by prohibiting the amount of exercise necessary to induce the latter." If the personal habits of patients with respect to smoking were more carefully noted in clinical records an etiological relationship might more readily be determined.

Relative to the above we quote Levine[7] as follows: "The sex distribution of this disease (coronary thrombosis) is most striking—a ratio of three and one-half males to one female. It is difficult to explain the great frequency of coronary disease in the male. One might ascribe it to the greater amount of physical work that men do, although some might question this and maintain that the humble housewife does just as much work in her home as men do at their occupations. Another factor that may be mentioned is the possible rôle of tobacco. . . At present no satisfactory answer to this question is available, but certainly the consumption of tobacco has been in the past almost entirely confined to men, and has been one of the few acquired differences in habit between the sexes. It is therefore logical to suspect this habit of playing some possible rôle in producing such a male preponderance in susceptibility to this disease. A more definite answer may be apparent before long if the coming generation of women continue the smoking habit that seems to have become so general." With further reference to this subject Aikman says:[1] "It is a well known fact that diseases of the heart and vascular system have increased at an alarming rate in the last few years. Of course the stress of modern life is chiefly blamed, but it seems that there must be some other great etiological factor that works in such a slow and insidious fashion that it is not easily recognized. Is it not possible that the disturbance of circulation which we have seen produced by a very small amount of tobacco, frequently repeated daily for years, may play a greater part in the general increase in circulatory diseases than we realize? Certainly we would hesitate to administer any drug, having as marked effect, over such periods of time." Pertinent also are the words of Baltzan:[2] "We have observed in the acute cardiac catastrophies, interpreted as coronary occlusion, a significant feature. As is well known the incidence of this disease is predominantly in the male. All except one of the persons in whom we have diagnosed this condition, a female, were habitual smokers of tobacco in one form or another."

In conclusion, we quote from an editorial which appeared in the *Journal of the American Medical Association* some years ago.

"The action, then, of tobacco smoke on man is exactly what might be expected from a knowledge of the action of nicotine. While the stimulation stage lasts the blood pressure is raised, then as the nerve cells are depressed the blood pressure falls, this fall being perhaps augmented by the depressing action of the pyridine bases. It can be scarcely doubted that the influence of the rise in blood pressure on the circulatory system can be injurious in some cases. While many persons can and do smoke in moderation without any noticeable effects ever being manifested, there are cases in which an hereditary tendency to arterial disease seems to be seriously accelerated by tobacco. Not only can aortic atheroma be produced experimentally in rabbits by injecting either nicotine or infusions of tobacco or by inhalation of smoke, but not a few cases have been observed in man in which there seems to have been no evident cause for an extensive arteriosclerosis other than excessive smoking."

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Special Articles

THE PÆDIATRIC-PSYCHIATRIC ALLIANCE*

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It is indeed a great honour and at the same time a source of considerable personal satisfaction to be able to take part in the opening of the new psychiatric division of the Hospital for Sick Children. Another practical foundation is being laid for the amalgamation between psychiatry and pædiatrics, a liaison service which has proved itself profitable to the advancement of both of these specialties and, above all, beneficial to the patients and their families.

It is interesting to halt for a while at moments of achievement and take stock of the trends and events which have gradually produced an idea, a wish, an urge, an effort, and finally an attainment. Like the mountain climber who stops from time to time to espy the distant spot in the valley from which he has started, we may be allowed on this occasion to inquire briefly into the tendencies and happenings which might show how the new psychiatric-pædiatric alliance we are celebrating tonight must be viewed as the natural outcome of a dynamic development. This alliance is by no means the result of a chance meeting of strangers, nor an act of reconciliation between alienated relatives; it is the logical conclusion of a progressive approximation of hopes, interests, and actual needs.

Psychiatry, once upon a time, was a gloomy, hopeless, thankless occupation. Its concerns were limited to the extremes and end-products of mental aberrations. To its care were relegated the human wrecks and failures for whom little, if any, hope was held out, beyond intramural custody and protection. While these unfortunates were swaying and stumbling and falling by the wayside, no one made an attempt or knew how to support them, to keep them from falling, to lift them when they had stumbled. They were labeled as are beer bottles, only with much less accuracy; they were diagnosed and classified; their symptoms were studied; a body of knowledge was accumulated about manifestations which then were believed to be part of inevitable disease entities, but the patients themselves could derive little benefit from that knowledge. *There was no such thing as child psychiatry.* Outspoken schizophrenic, manic-depressive, and hysterical reactions were observed very rarely before puberty. Psychiatric occupation with children was limited almost entirely to the low grades of mental deficiency. No attention was paid to the common behaviour problems of boys and girls. Their management was left in the hands of parents, teachers, clergymen, and sometimes the police. They were not looked upon as legitimate objects of medical curiosity. Whipping, scolding, sermons, bad marks at school, and the occasional prescription of tonics and sedatives exhausted the therapeutic resourcefulness available at that time. In the beginning of the twentieth century, significant changes took place in the field of psychiatry.

*An address delivered on the occasion of the official opening of the Department of Psychological Medicine of the Hospital for Sick Children, Toronto, June 23, 1937.

So long as psychotic manifestations were regarded solely as disease entities, with mostly unknown organic pathology, there existed little interest in the early evolution of the patients' personalities. On this continent, Adolf Meyer's formulation of the psychobiological concept of man as a mentally integrated individual shifted the emphasis helpfully from diagnostic terminologies, from mechanical compilations of symptoms, from organs and their diseases to patients as improperly functioning persons. This attitude whetted the appetite for a study of the personality development of the patients, of their abnormal functioning or behaviour, and of their assets which might be used constructively in helping them to overcome their difficulties. Once the habit of dealing with diagnoses had been supplanted by the habit of trying to readjust maladjusted human beings, one no longer was restricted to the interest in those people whose maladjustments had assumed the proportions of full-fledged psychotic collapses. Any person, adult or child, "normal" or "abnormal", who presented any kind of personality or behaviour problem became entitled to psychiatric investigation and treatment. Just as the pædiatric specialist treats a mild common cold as well as pneumonia, so the modern psychiatrist has learned to treat children with fear reactions, temper tantrums or food capriciousness which may be as far from being a forerunner of a psychosis as an ordinary stomach ache may be from being a symptom or forerunner of gastric carcinoma.

This change from almost complete psychiatric neglect of the child to the realization of the great value of child psychiatry was fostered by still another development, which has also originated on this continent. In 1908, Clifford Beers, an energetic and enthusiastic graduate of Yale University, was led by Adolf Meyer to turn to mental hygiene and decided to devote his organizing talent to the betterment and prevention of mental illness. His book, "A Mind That Found Itself", the foundation of the Connecticut Society for Mental Hygiene, and the formation of the National Committee for Mental Hygiene ushered in a movement which has since then assumed international significance. In 1930, the governments of more than fifty countries sent their delegates to the First International Congress of Mental Hygiene held at Washington, D.C. The development of mental illness and delinquency was to be prevented through educational measures and the earliest possible clearing up of personality disorders before hospitalization and penalization would become necessary. This attitude resulted in the desire to reach the individual during the formative years of childhood. In the course of time it was learned that it was not desirable nor wise to think always in terms of future psychoses or criminal careers. Children's behaviour problems came to be considered worthy of psychiatric attention for their own sake, because they existed and called for adequate guidance and not solely because of what might happen later in life.

Meanwhile, pædiatrics has not remained untouched by the new trends in psychiatry. This also is a comparatively recent branch of medicine. For the past half century the science of medical care and prophylaxis in childhood has made admirable progress in many directions. But for a period of time the pædiatrician, proceeding with remarkable speed in the building up and broadening of his specialty, has hardly had the time and opportunity to orient himself in the bewildering mass of new material offered by the psychiatric group, often in a vocabulary for which he was not adequately prepared. But he felt more and more clearly that knowledge of organ pathology and biochemistry, however vital, fundamental, and indispensable, was not sufficient to help to take care of all the problems with which children were brought to his attention. The methods which were so efficient in treating sick hearts, lungs, intestines, and kidneys, the methods which he successfully employed in curing and preventing scarlet fever and diphtheria, failed him altogether when distracted parents brought to him their children because of breathholding spells, temper tantrums, anxiety attacks, persistent thumbsucking, psychogenic vomiting, frequent masturbation, jealousy reactions, stuttering, tics, night terrors, hypochondriacal complaints, antisocial trends, or inability to progress satisfactorily at school. It has been estimated that anywhere from 25 to 55 per cent of all children brought to the pædiatrician's office have difficulties which are rooted in their personalities and in their modes of interpersonal relationships rather than solely in somatic disorders.

The pædiatricians, upon learning that helpful ways of dealing with such problems had been made available, began to wonder how they could incorporate them in their own work with children. They approached the subject with a wholesomely critical attitude. The growth of child psychiatry, like many another growth, was accompanied by "growing pains" which were mistakenly believed to be the essence rather than incidental and curable ailments. Thus, for a time, theoretical controversies, fantastic schemes, weird claims, peculiar terminologies, and unbridled enthusiasms with little content deterred most physicians from the utilization of psychiatric methods when dealing with their patients. Some people in authoritative places acted as if in every instance an elaborate and ceremonious technique were required which could be learned from a selected group of initiated people only and called for a considerable expenditure of time and money. The physicians were rightly disturbed by the spectacle of enthusiastic but medically untrained laymen rushing into the field and taking over some of the functions which the pædiatricians themselves were not quite capable of

assuming. The existing laboratories of child psychiatry, the child-guidance clinics, busy with the enormous task of building a new structure of knowledge and methods, did not have the time and were not equipped to make adequate contacts with pædiatric practice and teaching.

Meanwhile parents began to expect more and more that their pædiatricians display sufficient psychiatric intelligence in dealing with children's behaviour problems. Yet some of the leading pædiatricians were reluctant because their common sense and their scientific outlook revolted against speculations and wrong emphases that went under the name of child psychiatry. This revolt came to a head when, in 1931, Dr. Joseph Brennemann issued a sonorous warning to his pædiatric colleagues against what he called "the menace of psychiatry". But, curiously enough, it was this very warning that did more for a pædiatric-psychiatric alliance than many other efforts, however enthusiastic and welcoming in character. For Dr. Brennemann, in his eloquent appeal, took issue not with psychiatry but with its unskilful over-popularization, with the exclusive use and improper evaluation of certain tests, and with grotesque interpretations of behaviour. His warning in reality was a warning against certain menaces to sound and factual child psychiatry.

Just then, an experiment was begun at the Harriet Lane Home, the Pædiatric Clinic of the Johns Hopkins Hospital. Dr. Edwards A. Park, the director of the clinic, opened the doors of the Harriet Lane Home to a psychiatrist who was to establish his offices in the clinic building and work there together with the pædiatricians. The psychiatrist entered upon his assignment with the clear realization that he came to learn at least as much as to teach. He did not come to create needs artificially, but to study the really existing and felt needs and help to satisfy them to the best of his ability. He regarded his functions as twofold. Aside from an unparalleled opportunity for satisfying investigative curiosities, he envisioned his task as one of helping the patients who were sent to him and at the same time imparting to the pædiatricians the insight and skill necessary for the adequate handling of the common behaviour disorders of children. Together with the pædiatricians, in their own clinic, on their own grounds, and in their own vocabulary, he examines and treats patients who need psychiatric assistance. He and his co-workers are on daily call to the wards and outpatient department where the everyday psychiatric problems of the everyday child are taken up with the interns, with the parents, and with the children themselves. The Harriet Lane interns spend three days a week for a period of two months at the psychiatric division, where cases are assigned to them under supervision and where they acquire an attitude, a knowledge, and a method.

All these arrangements are governed by a spirit of mutual give-and-take collaboration. The psychiatrist has an opportunity to obtain first-hand information about many things which the average child guidance clinic, removed from a pædiatric hospital, has little opportunity to learn. Being placed in the main stream of a busy pædiatric centre, he sees in a constant flow the everyday problems as they come before the practising pædiatrician. He learns of the difficulties that may arise from hospitalization, acute illness, chronic ailments, and convalescence. He observes the problems that face the ward nurses and the social workers of the hospital. He has a chance to study the nature and extent of behaviour disorders of children suffering from asthma, eczema, and spastic colon. He has a chance to follow for years the personality development of premature, rachitic, badly nourished infants, of early ruminators and nystagmoid headshakers, of children with encephalitis, meningitis, epilepsy and lead poisoning.

Just as the child psychiatrist in this manner has an opportunity to become a better child psychiatrist, so does the pædiatrician emerge from this arrangement as a better pædiatrician. He soon learns to slough off some of the current misunderstandings about psychiatry. He learns to humanize his patients. He learns to make himself responsible for human beings, instead of dealing merely with collections of organs of specimens of a supposedly homogeneous species. He learns to consider the fact that some things are problems of one or another organ, others are problems of the child, still others are problems of the family and the environment, and most of them are combinations of several of these. Having learned sets of facts about tissue structures, organ functions and dysfunctions, and biochemistry, the pædiatric intern and medical student get acquainted with other similarly objective and concrete sets of facts about behaviour, performance, the functions and dysfunctions of the individual child, and his reactions to people and life situations. The pædiatricians are helped to develop a curiosity for the whence and why of children's behaviour disorders, and are taught to satisfy this curiosity in a scientific and factual manner. They perceive that the psychiatrist who works with concrete facts can well afford and really manages to refrain from glib toying with hypothetical assumptions of unproved mechanisms and complexes. They are saved from being embarrassed by modern parents who refuse to accept at its face value the assertion that stuttering or nightmares are merely the result of bad tonsils or mild anæmia. Their knowledge of pathology, limited hitherto to body structures, is broadened by the inclusion of the pathology of the acting, feeling and reasoning person. Their knowledge of treatment is broadened by the inclusion of psychotherapy, that is, informed and under-

standing treatment of the person, of the mentally integrated functioning of the individual and the group. Thus, the collaboration between psychiatry and pædiatrics aims to accomplish the following main results:

1. Service to the children who present personality and behaviour difficulties. Service to the children's families who are perplexed by these difficulties. Service to the community agencies working in behalf of children, such as the schools, the relief agencies, the juvenile court, etc.

2. Demonstration of objective, common-sense methods of examination and treatment which the pædiatrician can learn to use in his own practical work when dealing with common, everyday behaviour difficulties of children.

3. Helping the pædiatrician to assume full responsibility for the child as an individual, regardless of whether the child does or does not present behaviour difficulties.

The liaison service at the Harriet Lane Home has passed the experimental stage and become an integral portion of the pædiatric practice and teaching of the clinic. Its wholehearted acceptance by the Harriet Lane group and by the pædiatricians of the country has been a constant source of satisfaction and encouragement. Several of the leading pædiatric hospitals have begun, or are planning, similar arrangements. The Hospital for Sick Children is, to my knowledge, the fourth on the continent and the first in Canada to have brought its plans to a satisfactory realization. The fine preparation, scientific integrity, and excellent personality characteristics of the two men selected for the work give one the assurance that this department will be not only one of the first in chronological order but also one of the foremost from the point of view of service and scientific contributions to the relatively new field of child psychiatry.

A CHILD PSYCHIATRIC CLINIC IN A PÆDIATRIC DEPARTMENT*

BY EDWARDS A. PARK

Baltimore

I shall present the impressions of the pædiatricians of the Harriet Lane Home of the Johns Hopkins Hospital concerning the value of the Behaviour Clinic for Children established there six years ago. What I shall say is of an eminently practical nature, consisting in a summary of our experiences. It will take the form of questions and answers. The answers will be brief, as the limitation of time necessitates.

Is the hospital pædiatrician without special education capable of dealing with children suffering from behaviour disturbances? I reply for myself, that before Dr. Kanner established his clinic and taught us the principles of child psychiatry and procedure I did not understand the behaviour disturbances of children well enough to deal with them, and I have the impression that my colleagues lacked the requisite ability, also. Some pædiatricians, blest with natural interest and aptitude, may become good child psychiatrists without special education, but for most of us teaching is essential. Dr. Abraham Jacobi once said, "The young doctors . . . . may make the same mistakes one hundred times. One hundred mistakes are then called experience". Certainly the teaching of child psychiatry reduces by years the period of learning through trial and error. Child psychiatry can easily be taught to pædiatricians. Dr. Edward Kempf once said to me that symbolism in dreams almost always took visual expression and formed a pictographic language the meaning of which was at once apparent to the experienced. The behaviour disturbances of children in their turn tend to assume certain patterns, and these patterns indicate to those, who know, the kind of disturbance beneath the surface. The important point, however, is that the behaviour of children can be analyzed, rationalized, understood, so that the child can be helped. Pædiatricians are familiar enough with the external manifestations of faulty behaviour, tantrums, lying, stealing, exhibitionism and so forth; they perceive the effects; the trouble is that they do not perceive the underlying causes which may be far removed and hidden away. The tendency of the average pædiatrician, seeing only the external manifestation, is to attempt to quash it. He applies repressive measures which appear successful, but are not, because they do not eradicate the underlying cause. The latter soon vents itself again in abnormal behaviour of the same or some totally new kind.

Of course, a difficulty which confronts the untrained pædiatrician is ignorance how to proceed to examine a child with a behaviour difficulty. Knowledge of technique is just as necessary for successful psychiatric as for neurological examination. But that is easy to acquire. A greater obstacle for the busy hospital pædiatrician is time. Probably no kind of medical work which he may be called upon to do is so time-devouring as thorough psychiatric examination, and in no work is success so proportionate to the time plus pains. It is necessary not only to interview the child but also parents, teachers and others. One must make the child understand himself; one must make all those surrounding the child understand him; and one must also make them understand themselves. More than that, one must win from all conviction and support. Then, in addition, complicated readjustments

*From the Harriet Lane Home of the Johns Hopkins Hospital and the Department of Pædiatrics of the Johns Hopkins University School of Medicine.

An address delivered on occasion of the official opening of the Department of Psychological Medicine of the Hospital for Sick Children, Toronto, on January 23, 1937.

within or outside the home must be effected, and these may demand visits and interviews. Finally, the child cannot be forgotten; he must be kept under supervision as must those in his environment. The busy hospital pædiatrician, single-minded, has not the leisure to do all this, even if he does possess the knowledge and desire.

Can the pædiatrician master child psychiatry? He is capable enough, just as he is capable of developing into an excellent oculist, but as pædiatrician he is already forced to be more or less of a Jack-of-all-trades, and in the case of most of us there is not enough spare time or enough energy left to become an expert in child psychiatry. If mental capacity and time did not circumscribe us, like Faust, we would be masters of all knowledge. The ordinary pædiatrician can, however, acquire enough of the principles of child psychiatry to deal with children having the ordinary behaviour difficulties, just as he can learn enough about diseases of the skin to meet the usual demands from that part of us. Fortunately, child psychiatry is much easier to grasp than adult psychiatry, because the psychological processes of children are, relatively speaking, simple and transparent, and child psychiatry is far easier than adult psychiatry to put into practice. One reason is that the major psychoses of adult life do not exist, or at least very rarely make their appearance, in children, and another, that the activities of the child are less fixed to habitual association routes. Still another reason is that children suffer far more frequently than adults as the result of faulty environmental conditions. Through the act of birth the child is deposited and locked up in an environment in which he remains for years a prisoner. Many children brought to the child psychiatrist because of personality difficulties are healthy-minded persons in open or concealed rebellion against mismanagement. The trained pædiatrician or the child psychiatrist can do a great deal through changing the environment, for example, by educating teachers, parents and others how to adapt to the child's needs, or, on occasion, he can succeed through the substitution of a new environment for the old. Of course, the child psychiatrist can often do much by exerting his energies on the child himself. But the percentage of occasions when he can attain his object by working through the environment is probably far greater in the case of the child than in the case of the adult. The pædiatrician, then, can master enough child psychiatry to deal with the ordinary situations, but he probably must always look for aid to the child psychiatrist when faced with complex problems which require greater psychological insight and experience than he commands and which demand an infinite amount of time and pains.

Why must the pædiatrician know child psychiatry? He holds the strategic position. He is the first trained observer to enter the child's life, the first to detect mistakes in upbringing and education and to perceive unhealthy attitudes or habits. The pædiatrician is the pilot of the formative years, or, better, he is the last perfect example of the family physician, turned to in every trouble, now relying on his medical wisdom, now appearing in the triple part of guide, philosopher and friend. The pædiatrician as guide, philosopher and friend is none other than the child psychiatrist in disguise.

What is the duty of the child psychiatrist in a children's clinic? It is so to organize and develop his work that the great mass of children needing aid can have it. I have psychiatric friends who pride themselves because they confine their work to the intensive study of a few children. Such an attitude may be justifiable from the standpoint of research, but it does not meet the crying human need in a children's clinic such as ours in Baltimore or yours in Toronto. The pædiatrist must somehow manage to take care of all the sick children coming to the dispensary; similarly, the child psychiatrist must manage to care for all those needing psychiatric help. He cannot do this directly—the task is too large. Dr. Kanner estimates that about one child out of ten coming to the Harriet Lane Dispensary presents a problem requiring psychiatric assistance. The psychiatrist of necessity must function not only through the pædiatrician but also at his side. The duty of a psychiatrist in a children's clinic must be, therefore, not only himself to care for the problem children but to teach the pædiatricians to be his assistants and mates. This last is just what the pædiatrician wishes him to do. Finally, his obligation like that of all persons with searching minds must be to gain more knowledge, thereby raising the level of his own work and that of others. Interesting problems present themselves, psychological, social or mixed. The chief one is the main problem of his daily work: How best can asocial trends be overcome or adjusted so that the child may grow up in peace with society, serving some useful purpose; conversely, how can the intelligence and attitude of the community be improved so that the defective and maladjusted child will be protected and given a place in the social scheme? What becomes of these difficult children; are there surface or subterranean connections between the psychiatric disturbances of childhood and the major ones of adult life? From the child can one foretell the man, or perhaps save the man? It is obvious that such questions can only be answered by following, never by trying to penetrate the obscurity of the past. The old proverb, "The child is the father of the man", recognizes that the end is determined by the beginning.

What has the Behaviour Clinic done for the Pædiatric Department? To appreciate its accomplishments, it is necessary to review the situation which existed prior to its establish-

ment. When children came with behaviour difficulties which seemed to be of major importance and to dominate the situation, such as kleptomania, truancy, masturbation, we were in the habit of referring them to the Phipps Psychiatric Clinic, which is not more than 100 yards from the Harriet Lane Home. We could easily have gone with the children to the Phipps Clinic. But, though only a step away, the step took us from our own workshop into a strange one with different methods, different hours, and different peculiarities. Reports came back from the Phipps Clinic concerning patients referred, but they were brief and not satisfactory, certainly, from the standpoint of our education. When the child went to the Phipps Clinic it was, practically speaking, as if he had moved out of town, for we lost sight of him, unless some illness chanced to bring him to us again. When, on the other hand, children came presenting behaviour difficulties which in our eyes were of minor importance, or were mixed with some illness, we kept them in the Harriet Lane. We did not regard the problems involved as of much importance, certainly not enough for a Phipps consultation. Perhaps we gave a few words of advice such as a layman might have volunteered. But the advice was usually poor or inadequate, and was not constructive, for it was not founded on any real insight into the child's needs or appreciation of the necessary action. We did not realize the importance which seemingly small behaviour difficulties might have, and did not feel any particular responsibility.

These minor personality troubles belonged to the parents or teachers rather than to us; our duties lay in the field of disease. Such was our attitude. The result was that these children were almost totally neglected. The creation of the Behaviour Clinic in the Harriet Lane quickly brought this state of affairs to an end. The study and care of the neglected children was rapidly organized and carried out under our eyes and the great hole in our work filled.

But the development of the Behaviour Clinic affected our work in another way, for it at once improved our treatment of defective children. It gave us the benefit of intelligence ratings which were essential for correct grading, and greatly increased the accuracy of prognosis. It furnished expert advice in regard to home care and the directions which education and occupation should take, and it provided expert knowledge and assistance in child placement. I have a friend, a child psychiatrist, who told me that he expected to limit his activities to those children with personality difficulties who were intelligent. I remark merely that the child psychiatrist in a pædiatric clinic can no more conscientiously eliminate the mentally defective child from his sphere of activity than the dispensary pædiatrician can deliberately exclude from his responsibility children with malformations of the heart; defective intelligence and behaviour difficulties are too closely bound together. The child with defective intelligence is subject to behaviour difficulties springing both from without and within. The attitude of society toward the defective child, as toward the epileptic child, is repellent and repressive and creates in him hostile attitudes, and the child himself, because of his defect, lacks the ordinary powers of adjustment.

The care of children with behaviour disturbances and also of defective children in order to be satisfactory requires the employment of the community machinery. In Baltimore as community machinery I refer to the schools, juvenile courts, the Visiting Nurses' Association, and the Family Welfare Association, The Henry Watson Children's Aid Society, the special schools and institutions for defective children, our own Social Service Department, and so forth. The machinery of the community which can be used for its problem children is complicated and uncoordinated. To have its benefits some expert must be available who uses it all the time and hence understands how to employ it. Soon after the inception of the Behaviour Clinic, Dr. Kanner coordinated the community machinery for the care of our difficult children, and put it at the disposal of the Harriet Lane Home.

Of course, with the formation of the Behaviour Clinic the teaching of child psychiatry began. I shall not go into the subject of teaching in detail, but remark merely that Dr. Kanner used both the didactic method and the case system. At first he covered the entire field of child psychiatry by lectures, but after the appearance of his book this no longer became necessary. Since then, in order to impart the requisite knowledge, he has relied on personal contacts with members of the pædiatric staff over their cases. Indeed this case system of instruction has been from the beginning the one of greatest importance. At present the duties of the interns are arranged in such a way that each for a limited period of time is assigned to the Behaviour Clinic where he takes histories, makes examinations under supervision, gives intelligence tests, and acquires a knowledge of the community resources and their use. He goes at least once to the juvenile court, in order to witness its operation and gain a notion concerning its functions. The Behaviour Clinic has placed one of its representatives in the Dispensary so that any intern can have an immediate consultation. If the behaviour problem is within the intern's capacity the child remains in his care. If, on the other hand, it is too complicated, or the proper investigation and provision for the child would be too time-consuming, the case is taken over by Dr. Kanner or an associate, but under those circumstances the intern need not lose sight of the child because the Behaviour Clinic is a part of ourselves and contacts with its staff are so

intimate that the intern is able without effort to follow developments there.

What has the Behaviour Clinic in the Harriet Lane Home done for the Baltimore community? I can answer this question substantially by saying that the Behaviour Clinic has become the centre in the community for teaching and thought concerning the child with behaviour difficulties and is the court of final appeal. It is in process of raising the level of community intelligence and action in regard to children offering social problems. Specifically, the Clinic extends to the various child-caring agencies of the community, such as the relief organizations, placement agencies, and the juvenile court its consultation service for their children who present problems. It has established a close cooperation with the Baltimore schools. The Division of Special Education has for all practical purposes come to use this Clinic as its psychiatric consultation centre. Thus the difficulties of progress in studies, disturbing behaviour at school, irregularity of attendance, problems of the retarded and gifted child, specific reading and other disabilities are referred. The Clinic carries on an educational program within the community, assisting parent-teacher associations and the Child Study Association in their mental hygiene interests and parent education. Frequent contacts through common interest in certain children have resulted in a close collaboration with our reform schools, the State Training School for Feebleminded, orphanages and other institutions in which children are cared for. Mental hygiene clinics held in one of the counties carry psychiatric education into a rural section of the State. Thus the psychiatric clinic of the Harriet Lane Home has come to form an integral factor of the community organizations.

What has been the influence of the Behaviour Clinic on the pædiatric staff? It has made us pædiatricians view the child as a whole, and feel responsibility for him as a living, acting, thinking, feeling being. I once heard it said of a physician that he seemed to think of the patient as a "pair of kidneys between two sheets". We pædiatricians have thought too much of our patients in terms of rheumatic fever or diseased lungs. But the Behaviour Clinic has brought about a changed attitude and made us ask ourselves if we have done all within our power to safeguard mental health.

What is the attitude of the pædiatric staff of the Harriet Lane toward the Behaviour Clinic? The attitude is best expressed in a letter written me by a former intern. I give it, although it has already been published.

Intern A:

"The more that I see and add to my very limited knowledge of pædiatrics, the more I am convinced that psychiatry is not merely an adjunct but a fundamental component of that specialty.

"The value of an intramural psychiatric clinic depends entirely upon the manner in which it is conducted. If arranged properly, then its value is considerable; if supervised poorly, its value is negligible.

"The benefits to medical staff, patient, and psychiatrist depend on the intimacy of contact and degree of confidence existing between the two physicians supervising the case.

"To the intern, knowing personally the man to whom you might refer a case, feeling quite at liberty to discuss the situation, or at least to read a thorough case report, in your own case is of incalculable value, first, in adding to your own knowledge; second, in treatment of the patient; third, in promoting a greater interest in psychiatric or behaviouristic aspects of problems that present themselves.

"On the other hand, it is usually quite unsatisfactory when it is necessary to rely upon an independent isolated department. The records are apart, there is reduplication of much work, the impression of the psychiatrist is rarely discovered, and interest naturally wanes.

"In my opinion the psychiatrist probably experiences the same reaction. The patient naturally benefits by this coordination of effort. Cooperation and confidence are the keynote to the success, I believe, of the intramural clinic. Specific examples are numerous, but not sufficiently well defined in my mind for me to cite."

Where must a Behaviour Clinic for children be placed in order that it may have the greatest influence and usefulness?

It must be placed in a main stream of child life, preferably in a main stream of sick children; in other words, it is best located in a children's hospital. Illness and behaviour disturbances are confused. Children are sent to hospitals because of physical illness when the actual difficulty is psychological; abnormal behaviour may be the only external evidence of disease; illness brings out behaviour disturbances. Sickness and behaviour disturbances are too intimately connected with each other physiologically for either to be dealt with separately. If the Behaviour Clinic were outside the children's hospital there would be a repetition of the unsatisfactory situation which existed before the creation of a behaviour clinic in the Harriet Lane Home; children especially in need would not reach it; only those children supposedly suffering from major difficulties would be sent to it.

Then, too, children showing apparently trivial behaviour difficulties may be the ones most in need of assistance, and what seems trivial may be actually of major potentiality. It is in the adjustment of minor everyday difficulties that the child psychiatrist or pædiatrician exerts the greatest usefulness. Temper tantrums, bed wetting, vomiting of a functional nature, failure at school, failure to get on with other children, disobedience, exhibitionism, breath holding, etc., all belong to the child psychiatrist or pædiatrician. They are the conditions which commonly bring child and parents to the pædiatrician for aid; they are seen on every side in the patients thronging children's dispensaries.

Can the pædiatrician get along without the child psychiatrist or the child psychiatrist without the pædiatrician? Each has gotten along without the other in the past, but at the expense of how much poor work and work only partly done!

If the pædiatrician cannot see clearly without the psychiatrist, the psychiatrist is even more blinded without the pædiatrician. Since organic and psychogenic factors are so intermingled it is plain that the pædiatrician and the child psychiatrist must work together, each supplementing the knowledge and experience of the other. That is the only way by which complete results can be attained.

The Clinic for Psychological Medicine established at the Sick Children's Hospital will be a boon to many individuals, children, parents and teachers in need of psychiatric assistance or advice. It will be a free gift to pædiatricians and students, because it will impart a new knowledge and outlook and will open a new field of usefulness and development. Its inauguration is an auspicious event to the City of Toronto, especially to those civic organizations and institutions concerned with the welfare of children, because it marks the establishment of a centre of learning and education, a place of expert advice, a clearing house, a court of final appeal whenever questions arise involving maladjusted and defective children. Gradually its influence will become diffused and will raise the level of intelligence with which badly adjusted children are dealt with in the courts, the schools, orphan asylums as well as in private homes, and will substitute for neglect and repression a spirit of sympathetic understanding and friendly aid. Finally, the creation of the Clinic for Psychological Medicine is an event of importance in Canada, because from it other clinics of a similar kind are bound to spring in distant places, and men and women trained in it, whether going out as pædiatricians or full-fledged child psychiatrists, will begin to take their places and exercise their enlightening influence in its various communities.

Association Notes

The Annual Meeting in 1938

Without a doubt Geoffrey Chaucer was right! When the snows of winter have disappeared; when the birds sing again; when the leaves appear and the buds break; in the words of that first "sweet singer" in the English Tongue, "than longen folks to goon on pilgrimages". Nowadays we say, "It is time to take a trip!"

Our grandfathers and grandmothers had another name for this springtime restlessness. They called it "Spring Fever", and, to clear away any idea of straying far from the paternal rooftree, all the young folk were liberally dosed with sulphur and molasses. The means of travel in those days were not, of course, very far ahead of those enjoyed by Chaucer on his trip to Canterbury, and not half so romantic. The journey from Toronto to Halifax was not a thing to be lightly undertaken. It was not made on a streamlined, air-conditioned train, or in a limousine rolling swiftly over paved highways, as you will make it next June. It will not even approach Chaucer's pilgrimage in point of time or difficulty. At its end a genuine Nova Scotia Welcome awaits you and your families and friends. While you participate in the rites of Æsculapius, they can have a jolly time, and be your guides when your duties permit you to enjoy our city and province.

Part of the enjoyment of any pilgrimage comes from the tales you hear. There are stories of the hospital, the clinic, and the consulting room to be told and enjoyed. With due regard to the learned discourses of the lecture hall, some of the most valuable professional hints are picked up in the little, informal discussions held after the meetings or in the dining halls. There are accounts to be heard of new, original work; of advances in clinical medicine and surgery; of the progress of medicine in its relation to society. Then too there is the renewal of old friendships: Jones meets Smith for the first time since they left Old McGill, Old Toronto, Old Queen's, or Old Alma Mater, thirty years ago. 'Tis then you hear "the laughter not unmixed with tears", as old scenes, old faces, and youthful escapades are recalled. All these make up a good medical meeting. But we of Nova Scotia have tales of our own to tell. Each little indentation in the long coastline has its story of storm and distress mixed with sunshine and laughter. Life moves slowly and serenely, tempered with a philosophy with which we hope you will become acquainted and remain to enjoy. During the months to come we hope to tell you something of this, of the people who are imbued with it, and the places where they live and practice it.

In the past three centuries Nova Scotia has welcomed to its shores pioneer settlers from France, England, Ireland, Germany, Scotland, and the New England colonies. Though these have mixed sufficiently to adhere closely in harmony, yet each has retained to a degree characteristics of the original group. The descendents of the French are found in Digby, Yarmouth, Richmond, and Antigonish Counties. Those of the German settlers are mainly in the County of Lunenburg. The Scottish Highlanders settled in Pictou, Antigonish, and the counties making up Cape Breton Island. Halifax and Hants were the outposts of England; the New Englanders are here and there; while the Irish, God save them! are everywhere. So it matters little from whence sprang your roots, this Old Province has a bit of the old trunk for you to study and enjoy.

By this time I know an old Highlander just this side of the foothills of the Rockies is shutting his eyes, breathing in deep lungfulls of

the salt seaweed laden air, and smacking his lips in remembrance of the oatmeal porridge made from this year's grist at Robert Grant's Mill. Still farther, in British Columbia, a lad longs for some Tancook sauerkraut, and to see the ships go out in the dim mists of morning. You have been away from home a long time. Come back to see it once again next June, all you exiled sons and daughters of New Scotland.

But whisht! I fear I have wandered far from Geoffrey Chaucer. You remember he sought shelter at the Tabard Inn at Southwark. Freed of romance it was no doubt a "dump" according to our ideals. It is our belief that with the largest meeting of the Canadian Medical Association possible in Halifax next June, there will be an ample amount of good hotel accommodation. The Nova Scotian Hotel, owned and operated by the Canadian National Railway, will be our headquarters and the place where all meetings will be held. Nearby are other hotels, each of which is setting aside a number of rooms for guests at this meeting in anticipation of reservations. A list of these is given below with the number of rooms guaranteed us, and rates. Besides there are a number of residential hotels, and if necessary University Residences may be secured, so all will be comfortably cared for. *But Secure Your Reservations Early* if you wish to avoid confusion and delay. Write to the hotel of your choice direct, and it will confirm your reservation. If booked up, your reservation will be made at the next best choice by the Housing Committee. Make your mind up to attend now, and write today for reservations.

Nova Scotian, 100 double rooms, rates $5.00 and $6.00.
Lord Nelson, 100 double rooms, rates $3.00, $5.00, and up.
Carleton, 25 rooms, rates $1.50, $3.00, and up.
Halifax, 75 rooms, rates $2.00, $3.50, and up.
Queen, 75 rooms, rates $1.50, $2.50, and up.
Moderate rates at Hillside Hall, The Waverley, and Haliburton Inn also.

Now, a Very Happy New Year to all members of the Canadian Medical Association from your Brethren in Halifax.

The Executive Committee

The Executive Committee of the Canadian Medical Association met in the Chateau Laurier, Ottawa, on October 28th and 29th, with every member of the Committee present. During the busy two-day session a great many matters received attention, among which were the following.

FEDERATION

Some time before the meeting each member of the Executive Committee was sent a draft of the proposed Constitution and By-Laws for Divisions, with the request that he study it carefully and come to the meeting prepared to discuss it. At the meeting, a number of suggested changes were finally approved, after which it was agreed that the Committee on Constitution and By-Laws should be asked to study the plan as amended and report to the Executive Committee and the General Council. This whole matter will be fully discussed at the meeting of the General Council in Halifax next June.

CANADIAN MEDICAL ASSOCIATION: QUEBEC DIVISION

At the annual meeting in Ottawa last June it was announced that a new Medical Association was being organized in the Province of Quebec. This new Association now applied for recognition as the Quebec Branch of the Canadian Medical Association. This being granted, representatives of the Quebec Branch requested that the Quebec Branch of the Canadian Medical Association should now be recognized as the Canadian Medical Association: Quebec Division, in accordance with provisions of the Canadian Medical Association By-Laws for Divisions. A resolution was passed to this effect, and this new Division of the Canadian Medical Association was officially launched. The officers of the Quebec Division are prepared to bring their full membership into the Canadian Medical Association, collecting the conjoint membership fee locally and forwarding to the national treasury $8.00 for each member of the Division. There are now in the Canadian Medical Association two Divisions, namely, the Canadian Medical Association: Alberta Division and the Canadian Medical Association: Quebec Division.

CANADIAN SOCIETY FOR THE CONTROL OF CANCER

At the last annual meeting the Study Committee on Cancer was instructed to proceed with the organization of a Canadian Society for the Control of Cancer and a Department of Cancer Control in the Canadian Medical Association. Since that time Dr. J. S. McEachern, the Chairman of that Committee, has made a tour of Canada, discussing in the various provinces the formation of a Canadian Society for the Control of Cancer. He has set up a Provisional Board of Directors for this Society, composed of the following, Drs. J. S. McEachern (Chairman), W. E. Gallie, Geo. S. Young, Mr. Napier Moore, Mr. F. K. Morrow, Mr. E. S. Macfarlane, and the General Secretary. This Provisional Board has met on three occasions and reports progress with respect to the organization of the Society. It is expected that the Society will have Branches in each of the nine provinces. It is the intention of the Society to deal with and through the Chairmen of the Provincial Cancer Committees, and it will be left to these local men to arrange to have set up in their respective provinces a Provincial Branch of the Society

and to ask outstanding individuals whom they may select to associate themselves with the project. With regard to finances, it has been suggested as a tentative arrangement that 75 per cent of all money collected remain with the province and 25 per cent be paid over to the National Society, excepting where benefactors stipulate otherwise. This arrangement is subject to change at the end of the first year of operation. The Society will undertake a plan of lay education, involving the press, moving pictures, radio broadcasting, etc. It is proposed that the Society shall have a Grand Council of eighteen men, two from each province, one of whom shall be a doctor and the other a layman. The Grand Council, which will be the supreme body in the National Society, will have the right to select not more than five additional members to their body, making a total of twenty-three.

ORGANIZATION OF THE DEPARTMENT OF CANCER CONTROL

A Department of Cancer Control is being set up within the Association according to the plan approved by Council at the last annual meeting. A Board of Directors is being organized, consisting of a local nucleus on which the following have consented to act: Drs. T. C. Routley, Chairman, Geo. S. Young, Roscoe Graham, R. I. Harris, and William A. Scott, along with one representative from each province, whose names will be announced shortly.

The Department of Cancer Control received definite instructions from the General Council of the Canadian Medical Association to endeavour to set up in every hospital of 100 beds or over a study group on cancer and to carry out a program of medical and lay education.

An Authorship Committee has been set up under the chairmanship of Dr. Roscoe Graham. This Committee is now engaged in the preparation of a book dealing with cancer in every site. As soon as the different chapters have been prepared they will be sent for approval to the Dean of the Medical Faculty of each University, to be referred by him to the different departmental heads for criticism. When finally completed the book will be sent to every member of the Association.

Draft lectures will be prepared for lecturers if desired. It is urged that cancer be given a prominent place in all medical society programs. Newspaper articles are also being prepared for publication.

To finance its operations, the Department of Cancer Control has received an annual grant of $14,000 from the Board of Trustees of the King George V Silver Jubilee Cancer Fund for Canada.

PASTEURIZATION OF MILK

At the annual meeting in Ottawa, it was recommended to the General Council that the Association take some active steps towards intensifying the campaign which is being carried on across Canada with respect to compulsory pasteurization of milk which is sold to the public. Since that time reports have been secured from the different provinces indicating the extent to which pasteurization of milk is compulsory in the different provinces. After studying the replies received from the provinces, the problem was passed to the Committee on Public Health for study and report, in an endeavour to ascertain what further steps the Association should take in an effort to achieve the desired result.

THE ROWELL COMMISSION

The following resolution was presented to the Executive Committee for consideration by the Committee on Economics.

That whereas a Royal Commission has been appointed by the Federal Government and will shortly commence investigating the relationships between the Federal Government and the Governments of the various provinces as applied, among other things, to Social Services;

AND WHEREAS the Commission will probably study the question of the care of the indigent and the unemployed;

AND WHEREAS the medical care of the indigent, the unemployed, and the low wage earner is a question vitally affecting these classes of the people and the medical profession;

AND WHEREAS The Canadian Medical Association has gone on record as favouring the appointment of a Royal Commission to study the question of a Federal Health Insurance Scheme;

BE IT RESOLVED that the nucleus of the Committee on Economics recommends to the Executive—

1. That a watching brief be held by the Association on all proceedings of the Commission through its General Secretary, Dr. T. C. Routley, being present at the sittings;

2. That, if and when questions concerning the medical care and health of the people of Canada arise, The Canadian Medical Association be prepared to present the views of organized medicine in Canada, if such be deemed a wise course of action;

3. That the nucleus of the Committee on Economics is in favour of federal participation in any health insurance scheme introduced into any province.

After careful consideration of this whole matter, the following resolution was approved by the Executive Committee:

That we respectfully request the Rowell Commission to explore fully the question of a federal scheme of health insurance in order that a body of information may be obtained that would be of value to any government in Canada that might intend to enact legislation on health insurance;

Also that the whole question of medical care of indigents be carefully considered, with a view to placing the medical care of indigents on the same footing as the provision of food, clothing, fuel and shelter.

AND WHEREAS the federal government has already charged itself with certain matters concerning health,

such as medical care of mariners and Indians, quarantine, medical examination of immigrants and supervision of food, drugs, proprietary medicines and narcotics, health of animals and transmission of diseases from animals to man; and WHEREAS the Federal Department of Health might properly extend its field of activity to deal with the health and sanitary problems arising out of modern methods of transportation, such as by automobile and aeroplane;

AND WHEREAS other public health problems of national distribution and importance such as cancer, tuberculosis, mental hygiene, maternal welfare, child welfare, and venereal disease, form a most important part of the activities of the Federal Department of Health;

THEREFORE BE IT RESOLVED that we respectfully suggest that the British North America Act be amended where necessary so as to give the Federal Government more extensive jurisdiction in public health matters of national importance;

ALSO BE IT RESOLVED that the Canadian Medical Association stand ready, upon request, to place at the disposal of the Rowell Commission any information or assistance within its power.

The Chairman of Council and the General Secretary were then instructed to draw up a memorandum to be presented to the Rowell Commission; and the General Secretary was instructed to hold a listening brief in all the deliberations of the Rowell Commission.

MEMBERSHIP

One year ago an agreement was entered into between the Ontario Medical Association and the Canadian Medical Association, also between the Medical Society of Nova Scotia and the Canadian Medical Association, by which arrangements were made for a conjoint membership fee in the provincial medical association and the national association, collections to be made by the provincial association and $8.00 per member forwarded to the Canadian Medical Association. At the request of the two provincial associations mentioned above, the Executive Committee agreed that a similar plan should be operated for the year 1938.

SCHOOLS FOR LABORATORY TECHNICIANS

At the last annual meeting a committee was appointed under the chairmanship of Dr. W. J. Deadman, of Hamilton, to study the question of training and registration of laboratory technicians in Canada. This committee is undertaking the following studies:

1. The present methods of training pathological, bacteriological and biochemical technicians in Canada.
2. The qualifications and ability of the technicians now employed as such in Canada.
3. The desirability or otherwise of having standards for the recognition of schools or laboratories for the training of laboratory technicians.
4. The recognition or creation of a register of technicians for the guidance of smaller hospitals and doctors desirous of assurance of capability on the part of those making application, particularly those living at a distance.

This Committee will present its report at a later date.

THE JOURNAL

In the report of the Editor of the *Journal* attention was called to a number of papers published recently in the *Journal*, which are deserving of special mention, such as "The prevention of silicosis" by Denny, Robson and Irwin; "The use of protamine zinc insulin in diabetic coma" by Rabinowitch, Fowler and Beusley; "The relation between hormones and cancer" by Prof. A. Lacassagne, of Paris. The first of these papers has attracted widespread attention.

It was pointed out that it has been necessary, from an economic standpoint, to curtail the size of the *Journal* as much as possible without in any way lowering its standard, and, with this end in view, the editorial department has paid special attention to careful editing and to the limitation and grouping of illustrations.

It was suggested that, with due regard to the necessity for conserving space in the *Journal*, a special effort should be made to include in each issue something on therapeutics which would be of particular interest to the general practitioner.

INTERNATIONAL HOSPITAL ASSOCIATION

It was reported that the International Hospital Association which met in Paris, in July, 1937, at that time decided that the next convention of the Association would be held in Toronto in 1939. The American Hospital Association and the Canadian Hospital Council will meet in Toronto at the same time. It is expected that this will be the greatest hospital convention ever held in this country, and probably the greatest ever held on this continent.

NATIONAL RESEARCH COUNCIL

Almost a year ago a subcommittee of the Executive Committee was appointed to study and report upon the suggestion which had come to the Canadian Medical Association from the President of the National Research Council that an Associate Medical Research Committee be established. This matter was considered at the annual meeting in Ottawa last June, after which a resolution was passed expressing approval of the formation of such a committee under the ægis of the National Research Council and suggesting that a conference of representatives of interested bodies, *viz.*, Faculties of Medicine, Medical Research Institutions apart from medical schools, Dominion and Provincial Departments of Health, and nationally organized medical associations, *i.e.*, Canadian Medical Association and Royal College of Physicians and Surgeons of Canada, should be held for the purpose of nominating to the National Research Council the personnel of the Associate Committee on Medical Research and to outline the scope of its duties and responsibilities. A

conference of the organizations mentioned was held on October 28th in Ottawa, when arrangements were made to set up an Associate Committee on Medical Research, as suggested.

COMMITTEE ON NUTRITION

A suggestion was made to the Executive Committee by the Committee on Nutrition that authority be given them to arrange for outstanding speakers to be brought to Canada during the winter for the purpose of addressing meetings on the subject of nutrition. The Executive Committee approved this recommendation.

RADIO BROADCASTING

The attention of the Executive Committee was called to the new regulations affecting radio broadcasting, which came into effect on November 1, 1937, Section 7 of which reads as follows:

> "No one shall broadcast . . . (1) upon the subject of venereal disease, or other subjects relating to public health which the Corporation may, from time to time, designate unless such subjects be presented in a manner and at a time approved by the General Manager as appropriate to the medium of broadcasting."

It was suggested by the Radio Broadcasting Corporation that the Canadian Medical Association might deem it advisable to have cancer specifically mentioned as one of the "other subjects relating to public health" which might be designated as requiring special permission before any broadcast is made relating thereto. This suggestion was unanimously approved by the Executive Committee.

THE HALIFAX MEETING

Arrangements are well under way for the annual meeting which is to be held in Halifax, N.S. during the week of June 20th next. It is hoped that two prominent British speakers will be present. Information will be published in the *Journal* from month to month in further reference to the program and other arrangements for the meeting.

Federation

There are few if any in the profession who, with conviction, will argue against the value of medical organization. There are, of course, many who do not belong to any medical society but one is unfamiliar with any sound arguments which these persons have advanced in support of their self-imposed professional isolation. Indifference, inertia, selfishness, lack of desire to cooperate with others, mental obliquity, egotism—these and many other reasons can be advanced, but, in the final analysis, these same outsiders always look to someone or something to solve the medico-sociological problems which impinge upon their lives.

Medical organization, to be really effective, must begin with the individual and his immediate colleagues. That is why the local medical society very properly claims first allegiance on the part of the profession. If this local organization could meet all the corporate needs of the profession there would be no necessity for anything further, but experience has taught us that such is not the case. Problems which break through the local horizon and the provincial horizon have brought home to us very clearly that, in our own interests we require medical organization which, like Gaul, can be divided into three parts,—local, provincial, and national. And today in Canada we face many situations which give thoughtful men a deep sense of the need of a closely knit profession, capable of meeting any situation which may arise in any part of our far-flung land.

We need a virile, flexible, national Association, thoroughly representative of Canada as a whole.

We need just such an organization as Federation makes provision for—not only now—but in the future.

We need a Canadian Medical Association of such strength that, not only we in the profession but the citizens of Canada as a whole will look upon it as representing the best thought and opinion and influence of which the profession is capable. It is not further argument we need to build up a case for ourselves. The case is built up. It is man power we need to complete the structures. But while the general trend of thought appears to be favourable to Federation, inquiring minds ask, and one feels reasonably so, what are the advantages of Federation?

What are the advantages of any army corps over the same number of soldiers enlisted in several independent units? An army corps has every reason to act as a unit. It has one common objective, a definite goal, a problem to solve that requires the unification of forces and brains and equipment and the main chance may be irretrievably lost if efforts of available forces are uncoordinated, independent and sporadic. Battalions, of course, can and do win victories but they require to be flanked every step of the way by other battalions if ground gained is to be consolidated and kept.

We in Medicine in Canada should be an army corps. What other vocation has a common problem, objective and answer? Laws in the several provinces differ; industry has problems peculiar to the area; finance—taxation—education—social problems, all are subject to variation and differing legislation and interpretation. But, health, disease, the art and science of medicine are exactly the same in Halifax as in Vancouver, and all the way in between. Medi-

cine has a common problem. 'Tis true that the battalions of medicine, local and provincial, can and do accomplish much, but it is equally true that much more can be accomplished if we consolidate our position moving forward as a great national organization.

Federation means that every provincial medical association is supported by and supporting the efforts of every other province. Federation means more members. More members mean more strength, moral and financial, and that means more power to accomplish our objectives. Federation says to the doctors and to the public of Canada that the medical profession is one united body. What other way can we manifest solidarity within the profession?

The Canadian Medical Association, because it is national, has attracted to itself gift funds exceeding 400 thousand dollars. What have the provincial associations, working independently, all put together, received in a similar way? And Federation, making us just so much stronger nationally, can no doubt pave the way for still greater public confidence and support.

Federation says to the Parliaments of Canada, both Federal and Provincial, that legislation which is proposed interests all the doctors. It doesn't follow that Nova Scotia doctors will tell British Columbia doctors how to solve their legislative problems—each province, of course, is autonomous—but Federation does tell Nova Scotia and British Columbia and all other provincial governments that, in spirit, they are dealing with a united medical profession. When Scotland, and Northern Ireland, and Wales, and England talk to their local governments—they talk as the British Medical Association, speaking through the local profession of course, but speaking with force and influence which apparently serves the profession well in the Motherland.

In the event of the plan under consideration being acceptable to the Canadian Medical Association and the Provincial Medical Association, Federation will impose no unwarranted obligation upon any Association or individual. By paying the Divisional fee, the practitioner will become a member of that Division of the Canadian Medical Association. If he so chooses, he may become a member of the national body by paying the additional fee required to maintain the national organization.

Federation makes possible a lower national fee because it is confidently believed that Federation will greatly increase the number who will be willing to go beyond the provincial boundaries in their support of organized medicine.

Federation places the profession in a stronger position to speak with conviction and authority to all other groups in society on any and all problems which are of mutual interest and concern.

Federation makes no demands upon its component parts, the Divisions, which in any sense obligate them financially, nor does Federation interfere with the complete autonomy of a Division with respect to its own affairs.

Federation presents to the medical profession of Canada an opportunity for national organization along lines which must appeal to all nationally-minded citizens—and Canada needs more national thinking and acting if we are going to find our rightful place in the community of nations.

Federation gives each Division the right to appoint its representatives to Council.

Federation is the answer to the physician who says we have too many medical organizations. We cannot afford to be without the local society and the national body. Where then can we re-align our organizations? Federation is the answer.

Federation offers the distinct advantage of pooling ideas and problems which today are paramount in one province but which tomorrow may assume most important proportions in another province.

Federation after three years of study from coast to coast has failed to elicit any sound arguments against it.

Federation is a forward step and appears to have everything to commend it.

The success of the conjoint fee in Ontario and Nova Scotia (only two provinces which have tried it as yet) has been overwhelmingly successful and surely may be taken as an expression of opinion in favour of Federation. —From the *Bull. Ont. Med. Ass.*, 1937, 4: 120.

Hospital Service Department Notes

New X-ray Therapy Department at the Winnipeg General Hospital

The installation of a new high-voltage x-ray therapy apparatus has just been completed at the Winnipeg General Hospital. During the next few days preliminary tests and standardization work, necessary for accurate measurements of the radiation from this powerful apparatus, will be carried on. After the completion of this essential work the apparatus will be ready for the treatment of deep seated malignant tumours. This new department was made possible by the generosity of Mr. John

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

Approved General Hospitals

Name of Hospital	Location	Bed Capacity (excluding bassinets)	Distribution of Beds						Intern Service						
			Medical	Surgical and Gynaecological	Obstetrical	Paediatric	Communicable Diseases including Tuberculosis	Other Departments	Number of Interns excluding residents	Women Interns Accepted	Examination or Appointment	When Selected	Internship Begins	Salary Paid (first year)	Rotation or Straight
Victoria General.....	Halifax.....	252	48	101	—	15	4 C.D.	74	12 u.g.	No	Ex.	May 12th	May 15th	Yes	Rotation
Saint John General....	Saint John..	354	43 pb.	80 pb.	52	39	28 C.D.	112	6 g. +3 u.g.	Yes	App.	Prev. fall	July 1st	Yes	Rotation
St. Sacrament.....	Quebec.....	275	100 pb.	100 pb.	20	55	—	—	2 g. +7 u.g.	Yes	App.	May & June	July 1st	Yes	Rotation
Hotel Dieu de Quebec..	Quebec.....	350	50 pb.	102 pb.	—	—	—	198	4 g. +5 u.g.	No	App.	Mar. or Apr.	July 1st	Yes	Both
Jeffrey Hale's.....	Quebec.....	145	35	35	17	12	20 C.D. +16 Tbc.	10	2 g.	No	App.	January	July 1st	Yes	Rotation
Children's Memorial...	Montreal...	330	187 pb.	55 pb.	—	Yes	44 Tbc.	36 orthop.	13 g.	2	App.	Dec. 15th	July 1st	No	Rotation
Notre Dame.....	Montreal...	671	107 pb.	126 +44 gyn.	29	64	—	301	15 g. +20 u.g.	Yes	App.	March	June 15th	Yes	Both
Ste. Justine.....	Montreal...	500	99 pb.	117	33	460	60 C.D.	Yes	4 g. +13 u.g.	2	App.	Feb. & July	June 15th	No	Rotation
St. Joseph.....	Montreal...	350	90 pb.	100 pb.	—	—	—	36 urol. +124	7 g. +12 u.g.	No	App.	June	June	No	Rotation
Ste. Luc.....	Montreal...	400	110 pb.	110 +10 gyn.	36	70	—	64	12 g. +12 u.g.	No	App.	January	July	Yes	Rotation
Jewish General.....	Montreal...	185	Yes	Yes	38	26	—	121	13 g.	No	App.	February	July	Yes	Rotation
Montreal General.....	Montreal...	600	88 pb.	205	—	24	—	283	48 g.	Yes	App.	December	July	No	Rotation
Royal Victoria.....	Montreal...	709	79 pb.	136 pb.	214	30	—	250	50 g. +1 dent.	No	App.	January	July	No	Straight
St. Mary's.....	Montreal...	211	Yes	Yes	25	24	—	—	9 g. +1 u.g.	No	App.	February	July	No	Both
Ottawa Civic.....	Ottawa.....	540	52-75 pb.	125-200 pb.	90	80	—	20-30 E.E.N.T.	17 g.	No	App.	January	July 1st	Yes	Both
Ottawa General.....	Ottawa.....	321	24 pb.	67 pb.	17	60	7 C.D.	12 E.E.N.T. +134	9 g.	No	App.	February	July	Yes	Rotation
Kingston General.....	Kingston...	375	48 pb.	40 pb.	26	43	36 Tbc. +22 C.D.	20 urol. +20 E.E.N.T. +121	10 g. +1 dent.	No	App.	January	June	Yes	Rotation
Hosp. for Sick Children.	Toronto....	420	Yes	Surgical	—	420	—	—	20 g. +20 u.g.	Yes	App.	January	July 1st	No	Rotation
St. Joseph's.....	Toronto....	333	98 pb.	120 pb.	38	—	—	77	11 g. +2 u.g.	2	App.	December	July 1st	No	Rotation
St. Michael's.....	Toronto....	556	104 pb.	205 pb.	57	—	26 Tbc.	392	28 g.	Yes	App.	December	July 1st	No	Rotation
Toronto East General..	Toronto....	145	35 pb.	43 pb.	28	—	—	39	5 g. +1 u.g.	No	App.	April	July 1st	Yes	Rotation
Toronto General.....	Toronto....	1118	243 pb.	331 pb.	111	—	20 Tbc.	413	47 g.	Yes	App.	December	July	No	Both
Toronto Western.....	Toronto....	495	120 pb.	120 pb.	72	—	—	Yes	21 g. +4 u.g.	No	App.	December	July 1st	Yes	Rotation
Mount Sinai.....	Toronto....	82	Yes	Yes	20	5	Yes	Yes	4 g.	Yes	App.	December	July 1st	Yes	Rotation
Women's College.....	Toronto....	140	17 pb.	15 pb.	44	—	—	Yes	7 g.	All	App.	January	July 1st	No	Rotation
Hamilton General.....	Hamilton...	618	90 pb.	119 pb.	77	78	94 C.D.	160	23 gr.	No	App.	December	July 1st	Yes	Rotation
Brantford General.....	Brantford...	184	36 pb.	36 pb.	20	34	20 C.D.	38	2 g.	No	App.	December	July 1st	Yes	Rotation
St. Joseph's.....	London.....	263	23 pb.	26 pb.	47	51	—	25 E.E.N.T.	5 g. +1 u.g.	Yes	App.	Jan. 15th	July 1st	Yes	Rotation
Victoria General.....	London.....	400	90 pb.	60 pb.	44	80	22 C.D.	25 E.E.N.T. +79	12 g.	Yes	App.	December	July 1st	Yes	Rotation
Metropolitan General..	Windsor....	126	66 with S.	Yes	29	20	10 Tbc. +C.D.	Yes	3 g.	Yes	App.	January	July 1st	Yes	Rotation
St. Joseph's.....	Windsor....	113	Yes	Yes	32	17	—	—	3 g.	No	App.	November	July 1st	No	Rotation
Children's.....	Winnipeg...	121	Yes	Yes	—	121	—	—	4 g. +3 u.g.	2	App.	January	June 1st	Yes	Rotation
Winnipeg General.....	Winnipeg...	596	160 pb.	129 pb.	39	18	—	250	10 g. +17 u.g.	2	App.	December	July 1st	No	Rotation
Misericordia.....	Winnipeg...	185	Yes	Yes	40	10	—	Yes	2 g. +4 u.g.	No	App.	Nov. or Dec.	June 1st	Yes	Rotation
St. Boniface General...	St. Boniface	444	101 pb.	152 pb.	44	50	—	32 E.E.N.T. +25 urol.	6 g. +15 u.g.	1	App.	December	June	Yes	Rotation
Regina General.....	Regina.....	408	63 pb.	94 pb.	37	35	20 Tbc. +31 C.D.	128	7 g. +3 u.g.	No	App.	January	July 1st	Yes	Rotation
Grey Nuns'.....	Regina.....	204	25 pb.	49 pb.	30	30	5 C.D. +10 Tbc.	27 E.E.N.T.	3 g.	No	App.	January	July 1st	No	Rotation
St. Paul's.....	Saskatoon...	234	50 pb.	98 pb.	20	20	6 Tbc. +20 C.D.	20 urol.	3 g. +2 u.g.	1	App.	January	July 1st	Yes	Rotation
Saskatoon City.....	Saskatoon...	311	134 with S.	Yes	22	32	20 C.D.	10 urol.	10 g.	2	App.	December	July 1st	Yes	Rotation
Edmonton General....	Edmonton..	223	102 with S.	Yes	18	38	65 Tbc.	—	2 g. +3 u.g.	No	App.	Jan. & Oct.	Jan. & May	Yes	Rotation
Misericordia.....	Edmonton..	185	26 pb.	37 pb.	28	23	—	Yes	3 g. +4 u.g.	No	App.	January	July 1st	Yes	Rotation
Royal Alexandra.....	Edmonton..	460	90 pb.	90 pb.	50	50	37 Tbc. +63 C.D.	Yes	10 g. +7 u.g.	No	App.	January	May & July 1st	Yes	Rotation
University of Alberta..	Edmonton..	335	91 pb.	105 pb.	17	52	20 Tbc.	10 urol.	13 g. +5 u.g.	Yes	App.	December	July 1st	Yes	Rotation
St. Paul's.....	Vancouver..	345	Yes	Yes	35	20	—	Yes	5 g.	No	App.	Dec. & Jan.	July 1st	Yes	Rotation
Vancouver General....	Vancouver..	1167	117 pb.	234 pb.	110	105	121 Tbc. +94 C.D.	Yes	39 g.	Yes	App.	Nov. & Dec.	July 1st	Yes	Rotation
Provincial Royal Jubilee	Victoria....	388	159 pb.	117 pb.	40	31	42 Tbc. +15 C.D.	Yes	0 g.	No	App.	November	July 1st	Yes	Both
St. Joseph's.....	Victoria....	260	25 pb.	30 pb.	27	30	10 C.D. +20 Tbc.	20 E.E.N.T. +6 urol.	3 g.	No	App.	January	July 1st	Yes	Straight

The following hospitals are "Recommended" and those who want details about them are requested to write to Dr. Agnew:
Homeopathic Hospital, Montreal; Montreal Children's Hospital, Montreal; Woman's General Hospital, Montreal; Christie Street Hospital, Toronto; St. Joseph's Hospital, Hamilton; St. Joseph's Hospital, Guelph; Westminster Hospital, London; St. Catharines General Hospital, St. Catharines; Grace Hospital, Windsor; St. Joseph's Hospital, Port Arthur; McKellar General Hospital, Fort William; Grace Hospital, Winnipeg; Moose Jaw General Hospital, Moose Jaw; Holy Cross Hospital, Calgary; Lamont Hospital, Lamont.

A. Forlong, as a memorial to his deceased wife, Grace Anne Forlong.

This new apparatus is the most modern and powerful x-ray equipment in Canada, producing a much more penetrating form of x-radiation than has hitherto been available for the treatment of cancerous growths in this country. The supervoltage therapy equipment is of the constant potential type with a nominal capacity of 400,000 volts at 5 milliamperes. Together with the other types of x-ray therapy equipment already in the hospital it is housed in the handsome new building specially constructed for the purpose.

Ample supplies of radium and radium emanation are available to the hospital from the Manitoba Cancer Relief and Research Institute, and the radiation from this new apparatus fills a gap midway between the gamma rays from radium and the x-rays generated by the older equipment at about 200,000 volts.

The generator is so designed that it is capable of producing 450,000 volts at 25 milliamperes in order that two or more tubes can be operated if desired. This increased capacity also can take care of any x-ray tube developments that may be available during the next ten years. The equipment consists essentially of the constant potential high tension generator system, the shockproof tube drum and control panel. The generator itself comprises two insulating transformers and the four self-contained 100,000 volt constant potential units together with the x-ray filament transformer, designed so that two additional units may be added later to increase the capacity to 600,000 volts.

The control board is designed so that the operator has complete control of every circuit in the apparatus. A two-way communication system between the operator and patient is a built-in feature. In addition to the necessary meters, a time clock records the total number of hours of x-ray tube life. A visual indicator is also provided showing exactly what filters are in use up to seven at one time, whether the lead shutter is open or closed, and whether the x-ray energy is on or off. This latter is necessary as the equipment is practically silent in operation. In addition, the control is provided with every necessary safety interlocking device that makes it impossible to operate the equipment unless the machine room door is closed, the rectifiers are operating correctly, the x-ray filament is energized, the oil pressure and temperature is correct, etc. A Yale type key switch is also incorporated, locking the whole system. The whole of the generator and control system was designed and manufactured in Canada by Ferranti Electric Limited at their Mount Dennis plant in Toronto.

Medical Societies

The Ontario Neuro-Psychiatric Association

The Fall meeting of the Ontario Neuro-Psychiatric Association for 1937 was held at the Ontario Hospital, on November 19, 1937. There was an attendance of 114.

The President, Dr. J. P. S. Cathcart, of Ottawa, presided. Dr. J. R. Howitt, Superintendent of the Ontario Hospital, Toronto, extended the welcome to the visiting association.

The President announced it was hoped that there would be one or two meetings of the Association in addition to the usual Spring and Fall meetings, and that these would be of a clinical nature, the junior physicians of the service being encouraged to contribute the programs.

The program for the afternoon session was as follows: "Rupture of the intervertebral disc", by Dr. William Baillie, of Toronto, discussed by Drs. W. S. Keith and W. C. Kruger; "Traumatic psychoses", by Dr. J. A. Cummins, of Ontario Hospital, Hamilton, discussed by Drs. W. W. Barraclough and E. A. Linell; "Review of recent and past literature on neuroses and psychoneuroses", by Dr. A. G. Morphy, of Lancaster, discussed by Dr. J. P. S. Cathcart.

The usual dinner followed the afternoon session. Dr. J. G. FitzGerald, Professor of Hygiene and Preventive Medicine, University of Toronto, was the guest speaker.

The following are the officers of the Ontario Neuro-Psychiatric Association: *Honorary President,* Hon. H. J. Kirby, K.C.; *President,* Dr. J. P. S. Cathcart; *Vice-president,* Dr. D. R. Fletcher; *Secretary,* Dr. A. McCausland.

Executive Committee.—Drs. B. T. McGhie, C. S. Tennant, G. H. Stevenson, S. G. Chalk, W. W. Barraclough, A. L. MacKinnon, J. S. Stewart.

Editorial Committee.—Drs. E. A. Clark, J. A. Hannah, C. B. Farrar, C. H. Pratt, C. A. Wicks.

A. McCAUSLAND, *Secretary.*

The Regina General Hospital

At the pathological conference at the Regina General Hospital Dr. O. E. Rothwell gave a paper on sterilization. He stated that sterilization came under the criminal code of Canada and that any provincial laws on the matter were *ultra vires;* that in the case of Alberta if any patient who had been sterilized wished to take the matter to the courts no doubt he would find that the criminal code of Canada protected him and gave no protection to the doctor who performed the sterilization. Some years ago the Attorney-General's Department of Saskatchewan went into the matter. They cited many authorities to show that steriliza-

tion is a maim and that no doctor who performs this, even with the consent of the patient, has any protection from the courts but is liable under charge of criminal assault.

Dr. Paterson reviewed the salpingectomies done at the Regina General Hospital during the first six months of 1937. Four were classified as acute suppurative salpingitis, 12 chronic suppurative, 8 chronic non-suppurative, 1 tuberculous, 6 ectopic pregnancies, 5 chronic slight suppurative salpingitis which in his opinion did not require removal. Eight patients had normal tubes removed.

During the first six months of 1937 there were 172 dilatations and curettages done at the Regina General Hospital. Of these, 3 cases were adenocarcinoma; 3 were endometritis (unspecific, 2 cases, tuberculous, 1 case). There were 86 cases of endemetrial hyperplasia; of these 15 were marked, 64 were moderate, and 7 were slight. The moderate and slight cases were considered normal. There were two cases of membranous hyperplasia which had been operated on for dysmenorrhœa. There were two cases of decidual reaction; no chorionic villi were present. Ectopic pregnancy should be looked for in these cases. There were 55 cases of retained secundines.

LILLIAN A. CHASE

Post-Graduate Courses

International Medical Post-graduate Courses in Berlin

In spring of 1938 the following international medical post-graduate courses are prospected.

1. Constitutional pathology and clinical medicine. (From February 21st to 26th). Fee: 50,— RM.

2. Frequent mistakes in the diagnosis and treatment of internal diseases and their avoidance. (From February 28th to March 5th). Fee: 50,— RM.

3. Course on nourishment for healthy and sick. (From March 7th to 12th). Fee: 50,— RM.

4. Course on tuberculosis. (From March 14th to 19th). Fee: 50,— RM.

5. Course in diseases of the ear, nose and throat. (From February 28th to March 12th). Fee: 150,— and 100,— RM respectively.

6. Course for surgeons. (From April 25th to 30th). Fee: 70,— R.M.

7. Course for oculists in the University Eye Clinic. (From March 21st to 26th). Fee: 75,— RM.

8. Recent results in the field of the ray-therapy. (From May 2nd to 7th). Fee: 60,— RM.

9. Special courses in all branches of medicine, with practical work at the bedside and in the laboratory, to be held every month. For these courses participants are requested to communicate their wishes in order to obtain a complete program on their arrival.

Courses 1 to 8 will be held in German, and the special courses also in foreign languages.

For programs and further information apply to the Geschäftsstelle der Berliner Akademie für ärztliche Fortbildung, Berlin, NW 7, Robert-Koch-Platz 7 (Kaiserin Friedrich-Haus).

Topics of Current Interest

Etiology of Cancer of the Breast

The investigation of cancer by genetic methods has reached an interesting stage. The official publication of the International Union against Cancer[1] contains no less than three reviews on this subject, one by Prof. R. Korteweg of Amsterdam, one by Dr. L. Kreyberg of Oslo, and a third by Prof. Leo Loeb of St. Louis. A review on the same subject by Mr. A. P. Gorer appears elsewhere in this issue (of *The Lancet*). What has happened in this field of cancer research to stimulate all this activity? The study of cancer by the methods of genetics had disclosed the remarkable fact that by inbreeding it is possible to produce genetically pure strains of mice in which the mamma will exhibit the development of malignancy in either a uniformly high or a uniformly low percentage of female animals. Until recently this was advanced as an argument to prove that the etiology of cancer generally was essentially a problem of genetics and could be explained along mendelian lines. This view has never found acceptance by experimental pathologists. On general grounds they have been unable to look upon the highly complex group of biological phenomena, which for the sake of convenience are grouped together under the term "cancer," as if it was homologous to such comparatively simple biological phenomena as body size or coat-colour. Furthermore, in using a different tissue—the skin—as their test object, they found that although the skin of the mouse is very susceptible to the development of malignancy it does not show a high incidence of spontaneous skin tumours and that it was not possible by inbreeding to obtain a genetically pure strain of mice with a uniformly high incidence of spontaneous skin cancer. The study of carcinogenesis in the skin showed that the development of malignancy in that tissue depends on two main factors: the presence of

1. *Acta*, 1937, 2: 136, 146, 148.

a carcinogenic substance applied from without and the factor of susceptibility of the skin to that substance. The further study of the development of mammary cancer in genetically pure strains has gradually led to the same conclusion. Thus W. S. Murray[2] found several years ago if the ovaries of mice of a pure strain with a high incidence of mammary cancer in the females were transplanted into the males of the same strain that mammary cancer could be made to develop in the males. A. Lacassagne[3] performed the crucial experiment of producing mammary cancer in the males of such a strain by the prolonged administration of the ovarian hormone—œstrone. He demonstrated, further, that œstrone will produce mammary cancer more readily in males belonging to a strain with a high incidence of mammary cancer in the females than in those belonging to strains with a low incidence, and that œstrone will fail to elicit mammary cancer in the males of a pure strain in which no spontaneous cancer of the mamma ever develops in the females. The conclusion that two factors —carcinogenic substance and susceptibility— are essential for the development of mammary cancer in pure strains was thus established as clearly as it had been for skin cancer in mixed strains. The apparent difference between the etiology of skin and mammary cancer finds an explanation in the fact that in mammary cancer both factors reside within the organism, while for the skin only the factor of susceptibility resides within the organism and the carcinogenic substance has an external origin. The result of inbreeding is to accentuate only the factor of susceptibility or insusceptibility as the case may be. As Mr. Gorer points out, an explanation along mendelian lines may be applicable to the inheritance of the factor of susceptibility but not to the more complex phenomenon — the incidence of cancer of the mamma. The term susceptibility to mammary cancer is a vague—a deliberately vague—term, and it is by no means established that the factor of susceptibility resides entirely within the cells of the mamma. Cramer and Horning[4] found that the adrenals of mice from a genetically pure strain with a high incidence of mammary cancer undergo spontaneously a specific process of degeneration preceding the appearance of cancer of the mamma, and that the same process of degeneration can be induced in mice of mixed strains, in which it does not appear spontaneously, by the prolonged administration of œstrone.

Another new problem is introduced by the remarkable observation of J. J. Bittner, referred to by Mr. Gorer, that the fostering of the newly born females from a high cancer strain by mice from a low cancer strain greatly reduces the incidence of mammary cancer. It must be realized that these animals belong to a strain which, according to genetic conceptions, is still genetically pure and ought to have a high incidence of mammary cancer. It follows that in genetically pure strains of mice "some influence," as Bittner calls it, is transmitted through the mother's milk, which is of prime importance in determining the incidence of breast cancer. Here again an explanation along genetic lines is not easy to imagine. What is the part played by this factor, transmitted by the mother's milk, in the etiology of breast cancer? Is it concerned with the susceptibility factor or with the carcinogenic factor? And what is the nature of this "influence?" Is it inanimate — a chemical substance, or animate—a virus? The ingenuity with which cancer research workers are unravelling these intricate conditions makes it likely that we shall not have to wait long for an answer to these exciting problems. They may have an important application in the prophylaxis of breast cancer in women. The evidence presented by Cramer[5] in a recent paper on the etiology of cancer of the mamma in the mouse and in man shows that in the human subject also the mamma is an organ for which the familial incidence of cancer is exceptionally high. — *The Lancet*, Leading Article, 1937, 2: 455.

2. MURRAY, W. S.: *J. Cancer Research*, 1928, **12**: 18.
3. LACASSAGNE, A.: *C.R. Soc. Biol. Paris*, 1934, **115**: 937.
4. CRAMER, W. AND HORNING, E. S.: *J. Path. & Bacteriol.*, 1937, **44**: 633.
5. CRAMER, W.: *Am. J. Cancer*, 1937, **30**: 318.

Abstracts from Current Literature

Medicine

The Central Nervous System and Sugar Metabolism. Vonderahe, A. R., *Arch. Int. Med.*, 1937, 60: 694.

In view of the lack of correlation in many cases between the clinical picture and the lesions found in the pancreas in diabetic patients the author seeks an explanation in the pituitary or hypothalamine tissues. Tumours or injuries in this neighbourhood very frequently carry an associated glycosuria. The exact location of the lesion did not appear to be important in the cases quoted, so long as the tissues were sufficiently deranged by pressure, hæmorrhage or other injury. Again, evidence contributed by many investigators pointed to the hypothalamus as the location of the "centre" most vitally concerned. Five cases are quoted, one of subarachnoid hæmorrhage, two of gross hæmorrhages in

the midbrain pressing on the hypothalamus, one of cyst in the same region, and one of multiple capillary hæmorrhages in the hypothalamus. The author quotes a report on changes in the hypothalami of 15 diabetics and 5 other cases with differing diseases which shows a constant loss of cells in the nucleus paraventriculosus (and some retrograde changes in the other cells) in the diabetics, a lesion not found in the other cases. Also, the substantia grisea of the 3rd ventricle and the nucleus tuberalis lateralis showed degenerative changes in the cases that had shown psychotic states in life.

The author develops a theory that since the nucleus paraventricularis has a fibrous connection with the nucleus supraopticus, which is connected to the posterior lobe, and since the pituitary sends secretion into the hypothalamus which can effect hypothalamine nuclei, with these and other possible connections, the vagus and its control over the islands of Langerhans can be brought into action, making the nucleus paraventricularis a central stimulator of the production of insulin. Possibly the presence of sugar in the blood also stimulates this nucleus, as CO_2, the respiratory centre. Apparently persistent hyperglycæmia leads to exhaustion of this centre. It is suggested that the pituitary inhibits the action of the nucleus paraventricularis so that an increase in pituitary secretion would reduce the production of insulin and vice versa. These effects would be more lasting than those of the sympathetic system as occurring in states of anger and rage which are transitory.

P. M. MACDONNELL

The Supplementary Feeding of School Children. Wood, E. C. and Simpson, T. W., *Med. Press & Circular*, 1937, 195: 370.

Additional nourishment for school children has been receiving widespread attention of recent years. It has been very difficult to assess the value of this, since the diet is generally provided by parents with one eye, if not both, on the purse. However, statistical studies have shown that on the whole children are benefited by supplementary diet, but emphasis is laid on the need for balanced and readily assimilable food, rather than vitamin concentrates.

The present study covers a group of 72 boys and 72 girls between the ages of 8 and 11 years. For one year they were given daily equal calorific quantities of either milk, cod liver oil and malt, or virol, while a control group received no special treatment. The growth rate of the control group was subnormal. Those receiving the supplements showed significant improvement in weight, virol being the superior. There is special need for supplementary food in the summer term, especially in boys. Milk was no particular benefit at this season. Malt and cod liver oil benefited the females only. Virol benefited both sexes and gave a growth rate double that of the controls. It is concluded that a supplementary diet should contain as many of the essential food elements as possible, without excessive protein, and should be neither bulky nor unpalatable.

H. MACDERMOT

Surgery

Enterectomy in the Surgical Treatment of Hepatic Cirrhosis or Portal Obstruction with Ascites. Fuller, M. K., Cook, D. D. MacK., Walter, O. M. and Zbitnoff, N., *Surg., Gyn. & Obst.*, 1937, 65: 331.

The authors contend there are four reasons why this operative measure should be considered of value. The first is a mechanical one, and consists of obliteration of part of the portal venous bed. The second is a physico-chemical hypothesis of increased osmotic pressure in the remaining small bowel, thus slowing the rate of absorption with a consequent higher osmotic portal venous pressure. The portal venous blood must contain more metabolic waste products because of the slowed rate of flow so that removal of a percentage of these must lessen the permeability of the liver cells and increase the chances of regeneration of liver tissue. Finally, assuming that ascitic fluid is transuded through the visceral peritoneum, therefore, by increasing the ratio of parietal peritoneum more absorption will take place.

In the one case cited they removed 6 feet 8 inches of the small bowel, beginning 12 inches distal to the duodenaljejunal junction, with lateral anastomosis. Prior to operation the patient had spent 2½ years in his wheelchair. He was allowed up 10 days after operation; the tappings were continued for six months, with markedly delayed filling of the peritoneal cavity. It is now three years since the operation and the patient has been able to be around in his business clothes most of this time. His diet has been foods of his own taste.

FRANK DORRANCE

Pyogenic Osteomyelitis of the Pelvis. Kulowski, J., *Arch. Surg.*, 1937, 35: 571.

This is a relatively common devastating disease. In a series of 1,496 cases of pyogenic osteomyelitis there were 90, or 6 per cent, in which the focus of infection was in the pelvis. Pelvic osteomyelitis is primarily a disease of the growing period. About 60 per cent of Kulowski's patients were in the second decade. Antecedent trauma occurred in 35 cases. Pelvic osteomyelitis may be classified as a direct or a hæmatogenous infection. The former follows gunshot wounds, operations and compound fractures and is due to extension from a neighbouring suppurative process and infected decubiti. Seventy-four per cent of the cases were of the hæmatogenous form. Staphylococci were recovered in the great majority of instances.

The most striking feature of pelvic osteomyelitis is the relatively "dry" bony reaction as a subacute or chronic fibrous type of osteomyelitis. Extensive suppuration of the soft tissue is characteristic and was observed in 83 per cent of the series, and determined the course of the disease. Purulent collections tended to gravitate and accumulate in the anatomically related fascial spaces of the thighs, the lower part of the back, and the gluteal regions. Infected compound fractures of the pelvic bones are especially interesting because of the relationship of the bladder and the posterior portion of the urethra. The disease becomes chronic in practically all survivors. In differentiating this lesion, interest centres about the hip joint but also involves a discussion of a wide variety of other intra-pelvic lesions, such as inflammation of the lower part of the abdomen and pelvis, spondylitis of the lumbar and lower part of the dorsal region, sub-gluteal bursitis, malignant disease, tuberculosis and isolated abscess of the iliopsoas muscle. Roentgenographic examination is essential. Treatment resolves itself into the primary and secondary control of the disease. The former involves the initial systemic infection and the determination of the local suppurative process. Secondary control of the disease is based on anticipation of pathological extension, sequestrum, secondary infection, persistant sinus and exacerbations and, above all, on locomotor disturbances. G. E. LEARMONTH

Obstetrics and Gynæcology

Methods and Results of Treatment in Carcinoma of the Cervix at the Memorial Hospital. Healy, W. P. and Frazell, E. L., *Am. J. Obst. & Gyn.*, 1937, 34: 593.

Five hundred and fifty-one cases of histologically proved primary carcinoma of the cervix treated at the Memorial Hospital, New York, during the years 1928 to 1931 inclusive were used as a basis for this statistical study. Analysis shows that the salvage, as measured by the five-year survival rate, is improving but is still far from satisfactory. Further improvement of these results is dependent upon earlier diagnosis. Seventy per cent of the patients seen in this series were either advanced or hopelessly ill on admission. Because of the long silent period of growth many cases will not be diagnosed until late unless more frequent pelvic examinations are made.

The dose of effective radiation delivered to points 3 cm. or more lateral to the cervical canal is inadequate to control the disease in 70 per cent of the cases. Changes in technique are directed toward increasing the dose to the parametria without destruction of normal structures. The prognosis is influenced by the clinical stage of the disease, the age of the patient and the dosage given. The importance of preliminary roentgen radiation is stressed. Important complications are noted.

ROSS MITCHELL

Carcinoma of the Cervix During Pregnancy. Danforth, W. C., *Am. J. Obst. & Gyn.*, 1937, 34: 365.

The frequency of carcinoma of the cervix in pregnancy is about 0.03 per cent. Abortions are frequent and placenta prævia more common than in normal pregnancy. Labour may be gravely dangerous. Carcinoma is very rarely transmitted to the fetus. Unless pregnancy terminates prematurely carcinoma of the cervix seems to develop as well as in the non-pregnant.

The results of treatment are far better during the first six months. Irradiation, both by radium and deep x-ray, is the most effective treatment. This should be done at once unless the pregnancy is so far advanced that it is desired to allow the child to attain viability. If full radiotherapy is used the pregnancy is better terminated because of the risk of serious developmental harm to the infant. A moderate radium dosage may be used to check the growth of the tumour in order that the child may attain viability with less likelihood of harm.

Labour may be permitted to begin spontaneously if the cervix has a sufficient uninvaded area to permit dilatation enough for the passage of the child. Incision or dilatation of the carcinomatous cervix is gravely dangerous. If labour is not possible, Cæsarean section should be done as an elective measure. This should be followed by a Ries-Wertheim radical hysterectomy or subtotal hysterectomy with irradiation of the carcinomatous stump. The latter is favoured. ROSS MITCHELL

Ophthalmology

New Experimental Researches in Trachoma. Cuénod and Nataf, R., *Ann. d'Ocul.*, 1937, 174: 433.

The authors introduce the subject with a review of the work which they, associated with Charles Nicolle, have been carrying on. It is over thirty years since one of them with Nicolle began the experimental study of trachoma and arrived at certain conclusions which have been confirmed by recent pathological examinations. In 1909 and 1911 these authors, continuing their researches, reported upon a series of experiments done on the chimpanzee and man and demonstrated that the chimpanzee offers a perfect receptivity and that in him the lesions are of the same type and run the same course as in man. The beginning of trachoma is accompanied neither by inflammatory phenomena nor hypersecretion. The best method to bring on infection in the monkey is by means of scarifica-

tion, as without doubt trachoma may begin in man following the most superficial abrasion of the conjunctiva. Finally, trachoma in the chimpanzee is inoculable during a long period of its course; it is contagious in man under the same conditions and not only at the beginning of the disease, as we had up to then believed.

In reporting this new work the authors definitely demonstrated the insidious character of the onset of trachoma and the lengthy period that it was contagious. To crown these experiments Nicolle and Cuénod demonstrated in 1912 that the agent of trachoma was a filterable virus. They then describe in detail their experimental work in their study of the virus, also the details of the study of the trachomatous tissue and scrapings from the follicles of trachoma in which they found what they call "plastilles" (drops of plasma), and which they believe are analogous to the inclusions found in the epithelial cells by Prowazek and Halberstaedter. At different times they have inoculated lice, guarding against any outside contamination with trachoma virus, and the result was always a veritable swarm of rickettsia elements in the intestines, while the control lice remained normal. On the other hand, in many cases of infantile folliculosis or non-trachomatous conjunctivitis the inoculation of lice with conjunctival discharge was always negative. From their inoculation experiments with monkeys they believe that the trachoma virus might very well be classed in the rickettsia family, which may be more or less transmitted by agents of this family; and, secondly, if lice are not the only transmitters of trachoma they may constitute more or less of a reservoir for the trachomatous virus. The article is very extensive and should be read in the original, as it is too long for a complete abstract. S. HANFORD MCKEE

Urology

Hormone Excretion in Cases of Prostatic Hypertrophy. Rusch, H. P. and Kundert, P. R., *J. Urol.*, 1937, 38: 316.

The theory that the etiology of some types of prostatic hypertrophy may be a disturbance of the sex hormones has attracted the interest of numerous workers during the past few years. The fact that the anatomical and physiological integrity of the prostate in animals depends upon gonadal stimulation has been proved. Castration of such animals leads to atrophy of the gland, while the male sex hormone administered to a castrated animal maintains the prostate in a normal condition. Furthermore, the female sex hormone, œstrin, when administered to male laboratory animals, produces a condition of the prostate analogous to prostatic hypertrophy in man. This latter condition can be prevented if the male hormone is administered in conjunction with it.

Because of the large number of confusing reports on the quantitative measurements of hormonal substances in the urine the authors made determinations of both the androgenic and the œstrogenic hormones in the same specimen of urine. They conclude that in men suffering from prostatic hypertrophy there is relatively no change in the œstrogenic hormone, but that there is a definite decrease in the androgenic hormone in the urine. These findings tend to substantiate the theory that some cases of prostatic hypertrophy may be the result of a disturbed balance of the sex hormone.

J. V. BERRY

Primary Carcinoma of the Male Urethra. Harbach, F. O., *J. Urol.*, 1937, 38: 311.

Carcinoma of the urethra is rare. The literature is unanimous in this opinion, as it is also unanimous that this rare neoplasm is of a low degree of malignancy, is slow to metastasize, and is, due to its location, particularly suitable for resection. It is a disease of middle age, though Paton reports a case in a youth aged 18, and Kroiss reports a case in a man aged 91. The symptoms are those of lower tract involvement. The author believes every case of urethral fistula and stricture should be regarded as a potential case of urethral carcinoma. Kretchmer classifies the manifestations into four stages: (1) urethral stricture; (2) tumour formation; (3) infection, and it is here the diagnosis of periurethral abscess is made; and (4) the presence of a fistula or fistulæ. Hæmaturia in every case was one of the earliest signs.

The treatment of choice is radical operation, with block dissection of the inguinal nodes. In the very early cases radium may be used. The prognosis is poor, due to late diagnosis of the condition. A case is cited. J. V. BERRY

Neurology and Psychiatry

Loneliness and the Paranoid Syndrome. Parfitt, D. N., *J. Neurol. & Psychopathol.*, 1937, 17: 68.

In a pleasingly clear fashion the author points out the possible causal influence of loneliness in the appallingly numerous group of paranoids seen, particularly in women of the late middle-aged and pre-senile age groups. Cases are cited showing the frequency amongst widows and spinsters left alone, feeling their loneliness acutely, yet too proud and stubborn to endeavour to alter the situation. Delusions and ideas of reference are common, generally sexual in colouring, and presumably serving the double purpose of projection of blame and the gaining of attention.

Cardiovascular degeneration, high blood pressure, senile and menopausal changes serve to enrich, but not to create, the soil for the growth of this persecutory complex. It is not

suggested that loneliness is essential for the development of such paranoid pictures, but the author merely wishes to emphasize the importance of this factor, because in the early stages a good response to tactful overtures of friendship may be obtained, and constitutes the chief hope of averting severe breaks and certification.

G. PATERSON SMYTH

Extramedullary Tumours of the Upper Cervical Portion of the Spinal Cord. Saltz, S. E. and Jervis, G. A., *Bull. Neurol. Inst. of N.Y.*, 1937, 6: 274.

The diagnosis of extramedullary tumours of the upper cervical cord is not readily made in the early stages. It is not unusual to find the clinical picture of amyotrophic lateral sclerosis, similar to that of a spinal cord neoplasm in this region. Occasionally the clinical picture of dorso-lateral sclerosis is merely a prelude to the fully developed syndrome of cervical cord neoplasm. At times cerebellar signs occur with pyramidal involvement in these high cord tumours and may dominate the clinical picture, making it difficult to differentiate from multiple sclerosis. Involvement of the lower cranial nerves provides evidence of intracranial extension, and, taken in conjunction with the spinal cord signs, suggests an extramedullary lesion. Tenderness of the cervical vertebræ is of frequent occurrence. Manometric pressure determinations generally show considerable variation as to the presence or absence of block, probably due to the origin and growth of the neoplasm within the widest portion of the vertebral canal. Tumours which are situated ventrally display minimal sensory disturbances without a true sensory level. Regional localization is frequently made on the basis of the distribution of muscular atrophy. In 2 of the 5 cases reported by the authors the tumour was situated within the spinal cord exclusively; in the other 3 it originated in or extended into the posterior cranial fossa.

FRANK TURNBULL

Dermatology

Skin Eruptions in Patients Receiving Sulfanilamide. Manville, J. G. and Archinard, J. J., *J. Am. M. Ass.*, 1937, 109: 1008.

Eruption During Administration of Sulfanilamide. Goodman, M. H. and Levy, C. S., *J. Am. M. Ass.*, 1937, 109: 1009.

Dermatitis from Sulfanilamide. Frank, L. J., *J. Am. M. Ass.*, 1937, 109: 1011.

Purpuric and Scarlatiniform Eruption Following Sulfanilamide. Schouberg, J. L., *J. Am. M. Ass.*, 1937, 109: 1035.

Sulfanilamide: A Photosensitizing Agent of the Skin. Newman, B. C. and Sharlit, H., *J. Am. M. Ass.*, 1937, 109: 1037.

Hypersensitivity to Sulfanilamide. Salvin, M., *J. Am. M. Ass.*, 1937, 109: 1038.

Skin eruptions following the use of sulfanilamide are being reported with increasing frequency as the use of this drug is becoming more widespread. The six articles referred to above sum up the general character of the eruption and its etiological features. As in the case of many other drugs producing dermatitis medicamentosa, there is a characteristic eruption most commonly observed but a number of variations and even completely atypical reactions also occur. What proportion of the skin-eruption is attributable to toxicity of the drug and what to idiosyncrasy is undetermined. There appears to be evidence that reactions bear some relation to the concentration of the drug in the blood. Due to well known hæmolytic properties of the benzene ring it has been anticipated that hæmolytic anæmia would be observed. This occurred, and some relationship would appear to exist between this and the appearance of the rash, as in the case of the barbituric-acid derivatives. It has been observed that in most of the cases where the rash has been reported a high blood level of the drug has been aimed at. That the drug has vasculo-toxic properties seems evident from the occurrence of purpuric characters in the eruption in some cases. It has also been suggested that the eruption is of an allergic nature. Certainly a very small dose is sufficient to produce an eruption in some cases. One observer described an intense urticarial reaction accompanied by sneezing and lachrymation.

A striking feature, emphasized by two of the reporters, was the part played by exposure to sunlight. In ambulatory cases of gonococcal or streptococcal infection the eruption occurred only after recorded exposure to sunlight. From other reports it is apparent that the parts most likely to be exposed to sunlight—head and neck, extensor surfaces of arms and dorsum of hands —are most frequently affected. There appears to be a very good basis therefore for the recommendation of Newman and Sharlit that physicians should warn their patients receiving sulfanilamide to avoid exposure to direct sunlight.

The eruption is morbilliform or scarlatiniform, at times vesicular or purpuric, and on occasion has been accompanied by a febrile reaction. Desquamation usually follows. The resemblance to the reactions produced by phenobarbitol and its near relations is noteworthy.

D. E. H. CLEVELAND

Therapeutics

The Effect of Amniotin and Antuitrin-S in Diabetes Insipidus. Blotner, H., *New Eng. J. Med.*, 1937, 217: 592.

Experimental evidence has appeared suggesting that the administration of œstrogenic sub-

stance may suppress the diabetogenic and sex principles of the anterior lobe of the pituitary gland. The polyuric effect of certain extracts of the anterior lobe of the pituitary has been reported. It is believed that this lobe secretes a diuretic substance. Can this diuretic principle be suppressed in a similar manner? There have appeared clinical investigations to substantiate this idea.

This paper reports observations on 7 patients with diabetes insipidus following the injection of large doses of amniotin and of antuitrin-S. Daily fluid intake and output was observed before and after the administration of amniotin and antuitrin-S. In five cases 20,000 units of amniotin were injected daily for ten consecutive days. In 4 cases 1 c.c. of antuitrin-S was administered subcutaneously daily, or every other day, for two months. The persons studied were 3 men, 1 boy and 3 women who had had diabetes insipidus of idiopathic origin for a number of years. They were all relieved of the polyuria with the intramuscular or intranasal administration of pituitrin. They represented a variety of types—two essentially normal young men, two males with marked sexual underdevelopment, a young woman before the menopause, a woman beyond the menopause, and an obese woman after menopause without thyroid gland. The administration of amniotin or of antuitrin-S did not cause any decrease in the daily fluid intake and output of these patients.

LILLIAN A. CHASE

Prontosil and Similar Compounds in the Treatment of Puerperal Hæmolytic Streptococcus Infections. Gibberd, G. F., *Brit. M. J.*, 1937, 2: 695.

The new aniline derivatives have been employed at Queen Charlotte's Hospital since 1936; in the doses in which they have been given their use appears to be free from serious danger and has been followed by a very great reduction in the mortality rate for hæmolytic streptococcal infections. Analysis of the causes of this improvement in mortality rate shows that it is associated mainly with a decrease in the widespread invasion of tissues by the hæmolytic streptococcus rather than with a greater tendency to resolution of the disease once widespread invasion of tissues has occurred. This feature makes it necessary to consider whether the improvement since January, 1936, is due to the efficacy of the treatment or whether it is due to a change in the virulence of the prevalent organism. It is possible that both factors may be concerned. In non-fatal cases in which tissues beyond the limits of the birth canal have been invaded by the hæmolytic streptococcus there is some clinical evidence that the new drugs do actually hasten the resolution of the inflammatory process, and this is a good reason for believing that the treatment, rather than a change in the virulence of the organism, is responsible for the improvement in this direction.

While one is unwilling to guess how far the new drugs have been responsible for the undoubted improvement which has followed their clinical use, there is every reason to continue to employ them until their value or otherwise is firmly established.

ROSS MITCHELL

Hæmorrhage into the Pleural Cavity. Head, J. R., *Surg., Gyn. & Obst.*, 1937, 65: 485.

Hæmothorax is as old a surgical problem as warfare between human beings. Hippocrates believed that blood in the pleural cavity always became infected. Guy de Chauliac, Ambrose Paré, Laennec and Trousseau always closed the wound and allowed their further treatment to be guided by clinical progress. In the Great War early pneumothorax was induced by some Italian surgeons; more recently ligation of the anterior and posterior intercostal vessels, with suture of the lung-wound edges to the chest-wall has been practised. The author believes a closed acute hæmopneumothorax or hæmothorax controls hæmorrhage; he advises "watchful waiting" for the two indications, relief of rising intrapleural pressure or falling blood pressure.

The progressive decrease in blood pressure is aggravated by the decreased vital capacity, the increased resistance to intrapulmonary circulation and the pressure upon the heart and great veins. In dangerously increased intrapleural pressure the severe dyspnœa with the characteristic exaggerated Traube-Hering waves calls for aspiration of blood or (and) air. Blood in the pleural cavity does not clot; in the first few hours it may safely be reinjected. In general, a systolic blood pressure below 80 is an indication for transfusion. Forty-eight hours after stabilization of the blood pressure and respiration takes place replacement of blood by air should be carried out with maintenance of pneumothorax for 2 weeks to allow the lung to heal. Calcification of pleura and infection are rare. The author much prefers the closed method of treatment.

FRANK DORRANCE

Pathology and Experimental Medicine

The Precancerous Cervix. Strachan, G. I., *J. Obst. & Gyn. Brit. Empire*, 1937, 44: 625.

The author clearly defines the precancerous cervix, and states the predisposing factors and microscopic cell change leading up to true can-

cerous changes in the cervix. The investigation is based on 700 cervices removed for inflammation during the past ten years. A precancerous cervix is one-half way toward malignancy and is certain to proceed along this line unless checked. It is not definitely known whether a biological process affects one cell first and spreads from here to involve other cells, or whether a group of cells is primarily affected as a focus. Erosions, cervicitis, and ectropion predispose to abnormal proliferation in cervical epithelium; also leukoplakia of the cervix has the same relation to cancer here as it has in the vulva, skin, tongue, etc. The loss of elastic tissue below the basal-cell layer of squamous epithelium, spoken of as the de-elasticized and de-collagenized layer, with appearance of lymphocytic infiltration, allows downgrowths of epithelium. When these downgrowths become sharp-pointed they are more penetrative. In non-malignant squamous epithelium the cell cytoplasm is evenly stained, but in precancerous conditions the cytoplasm stains unevenly. Hyperchromatic particles are often seen in these areas, and if oil-immersion magnification is used mitotic figures are clearly shown. The larger size of the nucleus is also of importance. In the cervical canal the main precancerous change noticed was that the glands lose their racemose appearance and revert to simple tubular type. This change represents a metaplasia of the gland as a whole and not, necessarily, of the epithelium lining it.

P. J. KEARNS

Hygiene and Public Health

Girth and Death. *Statistical Bulletin,* Metropolitan Life Insurance Company, 1937, 18: 2.

"The longer the belt line, the shorter the life line." This observation is one of the most fundamental contributions of life insurance statistics to public health. The most recent insurance statistics show that men 35 per cent or more above the average weight have a mortality over one and a half times that of average-weight men; this despite the fact the overweight men are subjected to a more rigid examination than others before acceptance for life insurance. In the ages under 30 slight overweight is associated with favourable mortality, but over 30 overweight appears increasingly as an unfavourable condition. Most of the chronic diseases of maturity appear to bear more heavily on the overweights, particularly the cardio-renal group and diabetics. Even fatal accidents are more common among overweights.

It is evident that great gains in individual and community health are to be achieved by reducing the incidence of overweight. But in working towards this goal great care must be taken not to make the cure worse than the disease. There is some evidence that unsupervised attempts to reduce weight sometimes end in disaster. For this reason it is advisable that a reducing regimen should be under the control of a physician. This is particularly true in the case of young women. Unless overweight is excessive in this group there are no indications for reducing weight.

FRANK G. PEDLEY

Supply and Demand in the Professions in Canada. Dominion Bureau of Statistics, Ottawa, 1937.

The 1931 census gives some interesting figures regarding the number of physicians in relation to the population of the provinces and municipalities in which they live. The impression that there has been a relative increase in the number of physicians is not borne out by the following figures:—

	Population per doctor			*Population per doctor, 1931*	
	1931	1921	1911	*In cities of 3,000 or over*	*In other areas*
Canada	1,034	1,008	969	644	1,350
Prince Edward Island	1,397	1,303	1,302		
Nova Scotia ...	1,152	1,146	1,207	511	1,379
New Brunswick.	1,519	1,447	1,252	779	1,734
Quebec	1,046	1,065	1,002	704	1,375
Ontario	872	848	826	611	1,096
Manitoba	1,051	1,095	1,052	570	1,707
Saskatchewan ..	1,578	1,446	1,299	674	1,720
Alberta	1,255	1,074	1,015	610	1,800
British Columbia	954	861	943	695	1,289

	Population per doctor
Canada, 1931	1,034
United States, 1930	798
England and Wales, 1931	1,363
Australia, 1921	1,373
France, 1931	1,555

FRANK G. PEDLEY

HYPOGLYCÆMIC TREATMENT OF SCHIZOPHRENIA.—In a preliminary report of their experiences with the hypoglycæmic treatment of the schizophrenic reactions, C. A. Rymer, J. D. Benjamin and F. G. Ebaugh discuss the methods of study employed as well as the actual results obtained in their series of 7 completed cases. They feel that the results to date (excellent results were obtained in 5 of their 7 patients) are highly encouraging, although a long period of time will be necessary before a definite opinion can be given. Apart from its therapeutic value, the method offers an unusual opportunity for clinical and laboratory research. The most promising approach at the present time appears to them to lie in the qualitative study of remissions; not only whether the insulin treatment increases the number of remissions but also whether these are in any way better than or different from spontaneous remissions.—*J. Am. M. Ass.*, 1937, **109**: 1249.

Obituaries

Dr. Matthew Robert Blake, member of parliament for North Winnipeg, 1917 to 1921, and honorary Lieut.-Colonel of the Winnipeg Light Infantry, died in St. Boniface Hospital on November 21, 1937. Dr. Blake was born in Belfast, Huron Co., Ont., in 1876 of English-Irish parents. On his father's side he traced his ancestry back to Admiral Blake who served England so well in Cromwell's time. He graduated from Trinity Medical College, Toronto, and did post-graduate work in London and Dublin. Coming to Winnipeg thirty-five years ago Dr. Blake built up a large practice. In 1912 he assisted in raising the Winnipeg Light Infantry, and was Medical Officer of the regiment from that time till 1932, when he retired and received the long service medal.

He is survived by one son, Dr. Daniel Blake, now doing post-graduate work in London, and a daughter at home. He was buried with full military honours on November 23rd from St. Giles United Church to Elmwood cemetery.

Dr. Wendell Warden Carrothers, of Galt, Ont., died suddenly on November 27, 1937. He was born in 1892 and a graduate of the University of Western Ontario (1920).

Dr. Henry Hicks Coleman died at his home in Moncton on November 22, 1937, aged eighty-four years. He had been ill for about two years. Dr. Coleman had practised in Moncton for forty-three years. He was born in Sackville, N.B., on March 2, 1853. He was educated at Harkin's Academy at Newcastle, and graduated from the University of New York in medicine in 1877. Dr. Coleman was medical director of the port of Moncton and Physician-in-Charge of medicine for the Indian population in his county. He had always been a staunch supporter of the Moncton City Hospital, where for many years he served as anæsthetist.

Dr. William Caldwell Crockett, senior physician in the city of Fredericton, died on November 15, 1937, at his home in that city. He was seventy-seven years of age, having been born at Campbellton on July 25, 1860, the son of the late Dr. William Crockett. Dr. Crockett was educated at Chatham and later at the Fredericton Collegiate School. He obtained a B.A. degree at the University of New Brunswick in 1882 and his M.A. in 1884. He graduated M.D., C.M., from McGill University in 1886 and was valedictorian in his class. In the same year he received the diploma of L.R.C.P.(Lond.). He had been mayor of the city of Fredericton and a member of the legislature of New Brunswick. He had also been Chairman of the Board of Health for Fredericton and had served in many other civic and social capacities. He is survived by his widow, two daughters, and four brothers.

Dr. Hertel Lefebvre de Bellefeuille, of Montreal, member of the St. Jean de Dieu Hospital staff, died in his thirtieth year at the Ste. Justine Hospital on November 8, 1937.

Born in Montreal in 1908, he was the son of Dr. Gaston de Bellefeuille and Cecile Dalbec. After his studies at Ste. Marie College, he completed his medical course at the University of Montreal (1935) and spent two years in Europe on post-graduate work.

Dr. Louis Joseph Desy, of Montreal, died in Paris on December 7, 1937. He had retired from practice about ten years ago after being a general practitioner in Montreal for thirty years. He was born near Berthierville, Que., took his classical course at L'Assomption College, and graduated in medicine from the old Laval University Medical School, Montreal (1889).

Dr. Hugh Alexander Elliot, for the past ten years Medical Officer of Health for Leaside, and a Coroner for Toronto since 1934, died on November 16, 1937, aged forty-five. He was the son of Mrs. Elliot and the late Rev. J. J. Elliot, and was born in Hillsburg. He graduated from the University of Toronto in 1916. He served with the Canadian Army Medical Corps in the Great War.

Dr. James Switzer Freeborn, of Magnetawan, Ont., died on November 8, 1937. He was born in 1858 the son of the late Andrew and Emily Freeborn, of Invermay, Ont., and was a graduate of Toronto School of Medicine (1885). He served during the Riel Rebellion as an army surgeon. After post-graduate work in England he took up practice in Markdale and for forty years had practised in Magnetawan.

Dr. Jerome F. Honsberger, of Kitchener, Ont., died on November 9, 1937, in his seventy-ninth year. He was a graduate of the Medical Faculty of Trinity University (1886), L.R.C.P.(Lond.) (1886).

Dr. William James Kennedy, of Musquodoboit Harbour, N.S., died on November 9, 1937. Dr. Kennedy was the son of the late Rev. John and Mary Kennedy, of London, Ont. He was born in 1873 and graduated in medicine from Western University, London, Ont., in 1897.

First taking up practice at Casselman, Ont., he remained there for about a year, coming to Nova Scotia 38 years ago on hearing of a vacancy at Musquodoboit Harbour. Here he remained ever since, to become the hard working country doctor and family physician, excepting for a short time which he spent in post-graduate work in London, England.

Dr. Richard Mason Lipsey, of Toronto, died on November 25, 1937, at Toronto General Hospital after a brief illness. He practised medicine in St. Thomas for 40 years, being a native of that city, where he was born in 1864. He taught school there, and was a graduate of the University of Toronto in 1894.

In electro-therapy and x-ray work, Dr. Lipsey was one of Canada's pioneers, being one of the first physicians to own and operate an x-ray machine in this country.

Dr. Donald McKenty, of Winnipeg, died from coronary occlusion on December 3rd at his home. He was born on Amherst Island, Lake Ontario, in 1870 and came to Winnipeg in 1887 to visit his uncle who, at that time, was owner of the Manor Hotel. On his uncle's death he entered the Manitoba Medical College and graduated at the age of 46. He practised in Winnipeg until the time of his death. He is survived by his widow, three sons and two daughters. Two of his sons, Jack and Vincent, are practising medicine in Winnipeg.

Dr. Moses Louis Ship, of Montreal, died on November 3, 1937, after a lengthy illness. He was fifty-nine years of age.

Dr. Ship was born in New York but came to live in Montreal at an early age. He studied at Montreal High School and McGill University, graduating in medicine from the latter in 1902. He then took a post-graduate course in England and on the Continent, where he specialized in children's diseases and internal medicine.

Upon his return to Canada, Dr. Ship established the first milk station in Montreal and for years assisted actively in the work of the Montreal Foundling Hospital. He was the founder of the Herzl Dispensary and Hospital in Montreal and it was largely due to his efforts that the Montreal Jewish Hospital was established.

Dr. John Stenhouse, of Toronto, died on November 25, 1937. He was M.A. and B.Sc. of Edinburgh and M.B. Toronto (1894).

Dr. Charles James Wagner, of Toronto, died on November 16, 1937, of cardiorenal disease at the age of sixty-two. He had practised in Toronto for 36 years.

Dr. Wagner was born in 1875 and graduated from the University of Toronto in 1899, and spent a year abroad, studying principally in Strasbourg. On his return he began practice with his father, the late Dr. W. J. Wagner, and was appointed Demonstrator in the Department of Pathology of Toronto University. He served in this capacity until 1910. In the session of 1907-08 he was Demonstrator in Applied Physiology, and in the same session joined the clinical staff of medicine. In this department he taught until 1919 devoting himself to a busy general practice until a few weeks before his death.

Dr. Wagner was fortunate in his choice of an avocation. He was a violinist of real ability and his talent made him a valued member of the Arts and Letters Club. His wide knowledge of chamber music and his technical skill gave him a place in the inner circle of amateur musicians and he had friendships with many of the great professionals. He was an enthusiastic fisherman and his last triumph was the landing of a four foot maskinonge, taken with a casting line six weeks before his death.

Dr. Wagner was married in 1901 and enjoyed a singularly happy home life. He is survived by his wife and three married daughters. He was a charter Fellow of the Toronto Academy of Medicine, and held in respect and affection by a large circle of his fellow practitioners and colleagues in the university.

M. H. V. CAMERON

News Items

Alberta

At the close of nominations for representatives for the two-year term on the council of the College of Physicians and Surgeons of Alberta, it was found that there was only one nominee in each district; therefore the following were elected by acclamation. Drs. W. G. Anderson, Wardlow, District No. 1; R. Parsons, Red Deer, District No. 3; A. E. Archer, Lamont, District No. 5; W. A. Wilson, Edmonton, District No. 7.

The special committee appointed to prepare the submission of the medical profession to the Royal Commission met in Calgary, December 4th, 1937, and practically completed its work. While a copy of the proposed submission is not available, it is understood that the Commission's attention is being called to the ever increasing tendency to demand larger and more varied services by the public at the cost to the people as a whole, and that provincial revenues are insufficient to meet the need; consequently a responsibility seems to be placed on the National Government with its unlimited taxing power to take some action. Burdens have been placed on the provinces by the immigration of unfit people of other lands, therefore it is contended that the authority responsible for this immigration must be under an obligation to care for those who are unable to care for themselves. The records of the mental and tuberculosis hospitals indicate that the provinces are under a heavy burden, which should be lifted.

A meeting of members of the profession interested in the question of an organization to control cancer met in Calgary recently, and went on record as giving hearty cooperation with the Dominion Government. Steps are to be taken immediately to organize the whole province, when it is hoped, that active local committees will be set up in the various centres, such committees being composed of laymen as well as physicians, and being representative not only of individuals, but of service clubs, churches, and all organizations with humanitarian motives. It is hoped that, while not frightening the people, the province may become cancer-conscious, thus being willing to seek and follow authoritative advice in the matter of early diagnosis and treatment of one of man's greatest enemies.

A plan is on foot to have the family physician assist the Department of Health in locating cases of active tuberculosis which are untreated at the present time, and endeavour to get the patients to submit to recognized treatment, thus reducing the loss of life from a curable ailment. Since under the recent legislation the province assumes all cost of hospitalization, it is felt that better cooperation should be possible.

In two by-elections in Alberta since the Social Credit landslide of August, 1935, physicians have been elected to seats in the Legislature — Dr. Walter Morrish in Edmonton and Dr. Peter Campbell in Lethbridge. Both men are well known throughout the province and will render great assistance to sane legislation. Dr. P. M. Campbell was elected on December 2, 1937.

G. E. LEARMONTH

British Columbia

As quoted by the press, speaking in the Provincial Legislature on November 9th, Hon. G. M. Weir, Provincial Secretary and Minister of Education, renewed his plea for health insurance. He explained that by "state medicine", in which he claimed to be a 100 per cent believer, he meant that the state would be responsible for complete medical, dental, hospital, nursing and other services, and would finance the whole cost of services out of consolidated revenue. He said that the people of British Columbia were spending today nearly as much on health services as would be necessary to obtain the same benefits if state medicine were in operation. Among the studies which he suggested, preliminary to introducing such measures, in an enlargement of the present Act, he included a proposal to examine the new fee schedule introduced by the College of Physicians and Surgeons of British Columbia and decide if it was reasonable in terms of fees charged in other provinces. Making comparisons with other parts of the British Commonwealth, Dr. Weir stated that the rate of pay offered to doctors in British Columbia by the health insurance commission was 75 per cent higher than the rate recommended by the doctors themselves in South Africa. In South Africa the rates per person per year were $3.42 against $6.00 in British Columbia, and the discrepancy was even greater than indicated by the figures, since in South Africa the doctors would be responsible for the certification of the insured for cash benefits, involving extra examinations and clerical work. Dr. Weir estimated the total cost of health and welfare services including tuberculosis, mental diseases, venereal diseases, hospitals and public health services at more than three and one-quarter million dollars.

With the province rapidly becoming "a convalescent hospital for the prairie provinces," Dr. Weir declared that by 1947 the cost to the citizens of British Columbia would exceed 7 million dollars in health and welfare services.

The new wing of St. Joseph's Hospital at Courtenay, erected at a cost of $85,000, was officially opened on November 10th by Patrick Phillip, former Deputy Minister of Public Works. The addition doubles the accommodation of the hospital, providing 75 beds, quarters for 14 nurses and a chapel. The old centre wing has been remodelled with the addition of one storey and sun balcony. An electric elevator serves all three floors of the old and new wings. Two new features have been incorporated for the first time in any hospital. The first is the special glass used in the operating room windows which give a perfect diffused light, and the other is a special hospital door invented by the architects.

The first unit was opened in February, 1913, by four nuns of a nursing order sent out from Toronto by request of the head of a large logging industry having camps in the vicinity of Courtenay. In 1924 the capacity was increased from 25 to 34 beds and additional room in the maternity department.

The provincial budget introduced at the present session provides $195,000 more for hospitals. Total administration of health and welfare services will advance from $66,950 to $78,140 and statutory grants to hospitals will rise from $775,000 to $960,000.

The press reports the Hon. G. M. Weir, Provincial Secretary, as assuring the Legislature that the government has not abandoned the Health Insurance Act passed last session. He is reported to have said that in the past two months a number of friendly conferences have been held with representatives of the medical profession, that there would be more of such conferences, and he was hopeful that a satisfactory solution would be arrived at. Even possibilities of state medicine might be explored by the Health Insurance Commission, and the doctors, who were now "on the spot," could not permanently thwart public opinion. He quoted a number of general practitioners as saying that 80 per cent of the population would be better off under the Act than they are at present. In reply to criticisms of the limited application of the Act he stated that not a health insurance Act in the world covers indigents.

Construction of a 200-bed private hospital in the southern district of Vancouver, where they are at present conducting a refuge for unmarried mothers and their children, is proposed by the Sisters of Charity.

On November 22nd a fire broke out in the roof of the Trail-Tadanac Hospital, but orderlies kept it under control until the fire-department, summoned by a nurse, extinguished it. So efficiently was this carried out that only slight damage was done and most of the patients in the hospital were unaware of the fire.

The Provincial Government has announced that they will no longer contribute towards hospital maintenance of aged persons or indigents who are not actually in need of hospital care under the new regulations of the Hospital Act, as described by Hon. G. M. Weir, Provincial Secretary. It is anticipated that as a result of this withdrawal of the basic rate of 70 cents per person contributed to municipalities for the care of indigent hospital patients, that municipalities will be able to place such aged and indigent persons in boarding houses and rest homes at a cost of approximately $1.00 per day instead of $3.00 or $3.50 which it costs to maintain them in a hospital. D. E. H. CLEVELAND

Manitoba

The new Forlong Memorial X-ray Therapy Department of the Winnipeg General Hospital, containing the most modern equipment in Canada for the treatment of cancer, was opened on November 21st. It is housed in a new building of concrete construction, thoroughly insulated, and contains a 400,000 volt x-ray machine and accommodation for another 200,000 volt machine. A portrait of Mrs. Grace Ann Forlong, from the brush of Haskell Coffin, is hung in the corridor of the new building. It was in her memory that Mr. John I. Forlong presented the building and equipment to the Winnipeg General Hospital. Appreciation of the gift was expressed by Mr. H. E. Sellers, Chairman of the hospital board, and by Dr. G. F. Stephens, Superintendent of the hospital. The building was dedicated by the Rev. J. W. Clarke, of Knox Church. ROSS MITCHELL

New Brunswick

Dr. J. C. Meakins and Dr. J. S. L. Brown were the special speakers at the November meeting of the Saint John Medical Society. Dr. Meakins gave a concise, thorough, interesting and instructive synopsis of the present-day thought on the diagnosis and treatment of nephritis. This address might be taken as a model for one type of extra-mural lecture, as it brings to the man living in a non-university town a quick, authoritative summary of a subject of every-day interest.

Dr. J. S. L. Brown spoke on some of the newer work in the study of sex hormones. His address was of much interest as it gave some idea of the trend of investigation along a very complicated and rather new subject. Dr. Brown's paper might be taken as the complement of the first address. All together this team of speakers provided a real treat to their listeners and both were most willing to answer questions and amplify points brought up in discussion.

The Government of New Brunswick has announced that a contract has been awarded to complete the building at the River Glade Sanatorium, originally started in 1932 for a Nurses' Home, as another unit of the Sanatorium. This will provide 56 more patient beds. The approximate cost is $57,000.00. Construction will be started immediately. Further construction at this Tuberculosis Hospital will be considered in 1938.

A most interesting event took place at the Fredericton Victoria Public Hospital recently when William Sawes Kelly was banqueted on his retirement. Mr. Kelly has given constant service to the hospital and its staff since 1896, first as an orderly, then as Laboratory Technician, X-Ray Technician, Microscopist, Bacteriologist, Analyst and Surgical Assistant. He was a man of keen scientific thought, with many slowly acquired attainments in which he demonstrated an unusual proficiency, resourcefulness, sympathy with the sick, and ability to aid the various members of the staff. It is said that Mr. Kelly made the first x-ray examinations in the Maritime Provinces at the Victoria Public Hospital, Fredericton in 1902. Dr. G. Clowes VanWart, in making a presentation to Mr. Kelly, spoke very highly of his long association with the hospital. It is some times forgotten that such lay members of a hospital staff do much to shape the destiny and to assure a good repute of the hospitals in which they work.

At a recent meeting of the Board of Commissioners of the Saint John Tuberculosis Hospital, Dr. H. A. Farris was appointed Honorary Consultant in Medicine, succeeding the late Dr. W. E. Rowley. Dr. J. P. McInerney was appointed Assistant Consultant in Medicine and Dr. Chipman McKay was appointed Assistant Surgeon.

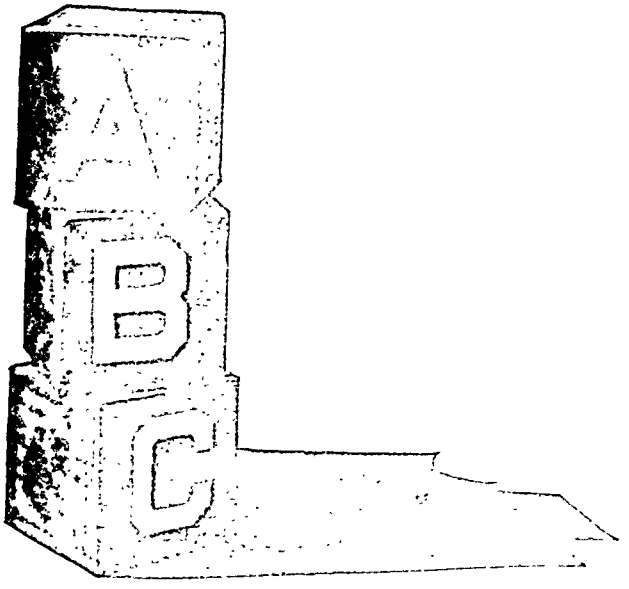
Dr. George M. White, Saint John, has been appointed a member of the Canadian Gynæcological Travel Society. A. STANLEY KIRKLAND

Nova Scotia

The death rate for the Maritime Provinces for the year 1936 proved to be the highest in Canada. For Nova Scotia the figure was 10.7 per 1,000 of population, compared with the Dominion ratio of 9.7. The figure for Nova Scotia is lower than that of New Brunswick and Prince Edward Island, which have respectively ratios of 11.0 and 11.1 per 1,000.

An agreement has been reached between St. Rita's Hospital at Sydney and St. Joseph's Hospital at Glace Bay by which the two institutions share the services of a radiologist. Dr. H. R. Corbett, at present working at the Nova Scotia Sanatorium at Kentville, has been

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appointed to the post. This appointment was made to conform to the regulations of standardization required by the Committee of the American College of Surgeons, which admitted St. Rita's Hospital recently to the list of approved hospitals.

Dr. J. P. McGrath was elected president of the Kentville Hospital Association at the annual meeting on November 27th last. The new hospital is nearing completion. Considerable progress has been made in securing funds for the new hospital.

Dr. Louis P. Robert, of the Montreal City Health Department, has been appointed medical examiner by the Canadian National Railways for the travelling clinic which will operate between Ottawa and the farthest eastern point on the Canadian National lines in the Maritimes.

Dr. S. L. Walker, formerly of Halifax and at present residing in Truro, was suddenly taken ill on November 20th. Latest reports indicate that he is making satisfactory progress.

Dr. Seymour MacKenzie, who formerly practised in Truro and later in Halifax, has returned to Truro and is now in charge of the practice of Dr. J. B. Reid during the latter's absence.

At the annual meeting of the Nova Scotia Mental Hygiene Society Professor Krug, of Mount Allison University, addressed the Society on the topic "The search for sanity". He urged the development of a Maritime Mental Hygiene Movement to interest the public in the establishment of mental health clinics and more adequate training opportunities for medical specialists in psychiatry, as well as instruction for parents and teachers.

N. B. DREYER

Ontario

The twenty-second annual clinical day of the Hamilton Academy of Medicine was attended by some 200 doctors from the city of Hamilton and outside points.

The recently published Report of Ontario Hospitals records that grants made to the general hospitals of the province for the year ending March 31, 1937, total $1,300,690.

On November 7th, the corner stone of the new wing of the Hotel-Dieu Hospital at Windsor, Ont., was placed in position with appropriate ceremony.

At the fiftieth annual meeting of the Hillcrest Convalescent Home it was decided to change its designation to "The Hillcrest Convalescent Hospital".

The Premier of the province announced at the end of November that he proposes to conduct an investigation of the wages and hours of labour of hospital employees in Toronto.

At the annual meeting of the Freeport Sanatorium, Kitchener, it was announced that the Waterloo County Health Association, which is in charge of the operation of the Sanatorium, is now free of all debt and that the new wing of the building is about completed at a cost of $64,000. Two hundred and twenty-three patients were admitted to the Sanatorium, of whom 118 were from Waterloo County. At the end of the fiscal year there were 149 patients in the hospital.

The Brant Sanatorium at its recent annual meeting reported an average of patients in residence during the year as 73.8. The 72 admissions were classified as follows: 5 juvenile, 28 minimal, 12 moderately advanced, and 27 advanced.

J. H. ELLIOTT

General

Royal College of Physicians and Surgeons of Canada.—The Annual Meeting was held in Ottawa on October 30th and the following particulars were announced in regard to the 1937 examinations and awarding of Fellowships.

Written examinations were held under the supervision of invigilators in Halifax, Quebec City, Montreal, Toronto, Edmonton and Vancouver, no candidates presenting themselves in the other selected centres.

The oral and clinical examinations were held in Montreal and Quebec.

There were 47 candidates for the Primary Examination, of whom the following 25 were successful: James Preston Robb, Westmount; Donald R. Wilson, Carleton Place, Ont.; Wilbert P. Brien, Windsor, Ont.; Cyril K. Benson, King, Ont.; Macia Campbell (Miss), Toronto; Clarence R. S. Davidson, Woodstock, Ont.; Kenneth G. Greer, Toronto; David W. P. Johnston, London, Ont.; John A. Hildes, Toronto; Stanley M. Hudecki, Hamilton; William K. Kerr, Toronto; George A. Lane, Sault Ste. Marie; David W. Lougheed, Toronto; Robert H. More, Toronto; George O. Watts, Toronto; James G. Watt, Toronto; Allen F. Graham, Toronto; Joseph G. La Salle, Quebec; Rene Letienne, Quebec; Jacques Turcot, Quebec; Arthur F. Vallée, Quebec; Joseph M. C. Bertrand, Sherbrooke, P.Q.; Paul E. Belisle, Montreal; Wilfrid Gosselin, Amos, Abitibi, P.Q.; Aime Pelletier, Joliette, P.Q.

There were 7 candidates for the final examination in the Division of Medicine of whom the following were successful: Richard Lessard, Quebec, P.Q.; Charles B. Rich, Provost, Alta.; Lewis D. Wilcox, London, Ont.

There were 11 candidates in the final examination in the Division of Surgery, of whom the following were successful: Alexander S. Allen, Kiating, Szechwan; Edmund H. Botterell, Toronto; Stuart D. Gordon, Toronto; Victor O. Mader, Halifax; Ross Robertson, Gravenhurst; William C. Whiteside, Edmonton.

Ad Eundem Fellowship was granted to Walter Ford Connell, M.R.C.P.(Lond.), 1932, Kingston, Ont. and Ralph Richard Fitzgerald, F.R.C.S.(Eng.), 1933, Montreal, Que.

The 1938 examinations will be held in October, the Writtens in numerous centres throughout Canada, and Orals and Clinicals in Winnipeg and Toronto, and for candidates in the French language in Montreal or Quebec.

Officers for the ensuing two years were duly elected and installed, and new members of Council for a period of four years.

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Book Reviews

A Text Book of Medicine. C. P. Emerson, M.D. 1296 pp., $9.00. J. B. Lippincott, Montreal, 1937.

This work introduces several unique features. In the preface the author says: "Our plan is to present International Medecine in terms of the clinical pictures of diseases, and to explain these by findings of pathology, biochemistry, and the other pre-clinical sciences, rather than to emphasize the latter, mentioning symptoms as logical consequences of disturbances in these fields". These contributions of the pre-clinical sciences are given in special paragraphs and footnotes and add greatly to the usefulness of the book.

Several other innovations are to be noted. Short biographical sketches of men who have made outstanding advances in special fields are included. Each disease syndrome is presented as a defense mechanism. The emotional reactions of the patient to his condition is considered.

Altogether this book is to be recommended to the student and the practitioner who wishes to obtain an adequate knowledge of a particular disease. Essential references are supplied for those who wish wider information.

The Common Neuroses. T. A. Ross, M.D., F.R.C.P. Second ed., 236 pp., $3.00. Macmillan, Toronto, 1937.

Doctor Ross has produced a clear and compact description of the diagnosis and treatment of the neuroses. It is a work which should be of particular interest to the general practitioner, as the type of patient described will be met with more frequently in general practice than in an institution. Many psychiatrists may challenge the dogmatic distinction between the neurotic and psychotic patient which is drawn on page 2. The author holds that "there is no real similarity between the two states". Farther on the author admits the difficulty at times in distinguishing the neuroses from the psychoses, acknowledging that some believe that the difference is one only of degree. The author believes that it is essential to distinguish the two for purposes of treatment. The danger of suicide is said to be negligible in the case of the neurotic patient, whereas it is a real danger during the depressed phase of a manic-depressive psychosis. There is a classification of the neuroses into three main groups. It is a relief to find that this classification does not require the addition of many new terms to the exhaustive nomenclature now in existence.

Practitioners who have strong views regarding Freudian psycho-analysis may be unfavourably impressed with the author's non-partisan valuation of Freud's methods in the statement that "yet it is more than doubtful whether psychoanalysis is always the best method of therapy. There are cases where it is the best, but there is a large majority where it is unnecessary and perhaps harmful, and where better results can be obtained by something much simpler. There can be little doubt of its danger, and it is possible that on the whole, as practised at present, it works more harm than good to the community. Nevertheless it must be acknowledged that the present interest in psychotherapy is due largely to Freud".

Gastroscopy, the Endoscopic Study of Gastric Pathology. R. Schindler, M.D. 343 pp., illust., $7.50. *University of Chicago Press, Chicago, 1937.*

The medical profession generally and gastroenterologists in particular will welcome the first comprehensive monograph on gastroscopy in the English language. Dr. Schindler's original study was published in Germany fourteen years ago. During the interval he has made 2,600 gastroscopic examinations. The interpretation of the gastroscopic appearance of the normal and diseased stomach described in this book is based on this unique and large experience.

Dr. Schindler deals with the history, technical problems, and technique of gastroscopy, which will be of greatest value to anyone interested in this subject. His chapter on the recognition and classification of gastritis, as studied by the direct method, is probably the first comprehensive study of this subject to be found in the English language. For many years gastritis has been neglected for want of positive clinical confirmation of such a diagnosis. The use of the endoscopic method has done much to clarify our knowledge of this disorder. Gastric ulceration, a subject of interest to physicians and surgeons, is discussed from the endoscopic viewpoint. The appearance of the stomach after operation is a contribution of real value.

The section on cancer of the stomach is important in that it emphasizes the early diagnosis of this very common disease, and deals with the manner in which the gastroscope assists in the differentiation between the simple and malignant ulcer. Dr. Schindler discusses the assistance derived from the gastroscope in determining the operability of gastric carcinoma. It is to be hoped that more routine gastroscopic examinations in people of cancer age with chronic dyspepsias will lead to earlier diagnosis and the institution of earlier radical surgical treatment.

This book is highly recommended to all physicians who are interested in the study of "living pathology" of the stomach.

External Diseases of the Eye. D. T. Atkinson. 2nd ed., 718 pp., illust., $8.00. Lea & Febiger, Philadelphia, 1937.

This edition has been carefully revised and brought up to date. There are many additions, chief among them being suggestions on slit lamp microscopy and on orthoptic training, together with observations relative to allergic ocular manifestations. We notice some improvement in the work, but some of the criticisms directed against the first edition, we think, still hold good. The title is open to question. Despite the precedent afforded by certain distinguished ophthalmologists whom the author mentions, we submit that the title adopted, namely, "External Diseases of the Eye", is arbitrary and artificial. External diseases of the eye are defined as "such conditions as may be diagnosed without the use of the ophthalmoscope". One might, just as well, divide surgical conditions into those which can be treated by poulticing and those which require the knife. Then, certain of the illustrations are of little value. This criticism applies chiefly to those made by photography from wax models. Some of these, notably those that deal with operative procedures, are undoubtedly useful, but where inflammatory conditions of the skin, of various kinds, are depicted the result is not good. Those who are not familiar with these conditions will hardly learn to recognize them from the pictures, while those who are will not need them. The other illustrations are mostly good and illuminating. A useful bibliography, not too extensive, is appended to the various chapters. The author deals at some length with certain affections seen in tropical and subtropical districts, as befitting his personal experience, though these are not often seen farther north. He has, wisely, included a consideration of the intra-nasal and related conditions which may



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directly or indirectly involve the eye. At the end there are helpful chapters on the hygiene of the eyes, on history-taking and case records; also, on the remedies of use in the therapeutics of the eye, and there is an ophthalmological formulary.

This book will be of more use to the student and tyro than to the full-fledged specialist, but is definitely of value as giving the personal opinions and practice of an ophthalmologist of wide experience. For that reason it will be welcomed.

A Text-book of Ophthalmic Operations. H. Grimsdale, M.B., F.R.C.S., and E. Brewerton, F.R.C.S. 3rd ed., 322 pp., illust. Baillière, Tindall & Cox, London, 1937.

This textbook has been a favourite for many years. Previous editions had seemed to deal too fully with historical operations; in the present much of this matter has been judiciously pruned, and the work is more thoroughly practical and, of course, more modern.

The order in which the various topics are considered is much as before. There are twelve chapters, captioned as follows: operations on muscles; operations for ptosis; operations on the lids; operations on the conjunctiva; enucleation and its substitutes; operations on the lachrymal apparatus and bones of the orbit; cataract; after-cataract; the operative treatment of glaucoma; some operations on the cornea, sclerotic and iris; foreign bodies in the eye. The various procedures in each field are set forth in considerable detail, and a judicial appraisal of the various operative measures is always forthcoming and is one of the most valuable features of the book. The ophthalmologist can quickly, and without consulting a mass of literature, decide what will be of value to him in any given situation. The technique is made clear by numerous bold drawings of a somewhat diagrammatic character, which are altogether admirable. The various points are always given in a direct yet pleasing way. Finally, the "get-up" of the book is attractive; the paper is thick; the type is strong and clear; and, as becoming a book by ophthalmologists, the contents can be read with a minimum of eye-strain. Altogether, an admirable book for its purpose.

The Normal Encephalogram. L. M. Davidoff, M.D., and C. G. Dyke, M.D. 224 pp., illust., $5.50. Lea & Febiger, Phila., 1937.

A neurological surgeon and a roentgenologist here provide the basis for the study during life of the gross anatomy, be it normal or pathological, of the brain, meninges and cerebral vessels. The reader is informed as to the history, indications and technique of encephalography. The gross anatomy of the brain is reviewed and fully presented in terms of roentgenograms following air injections.

The object of the book is to present a fundamental thesis on encephalography based on an experience of 4,000 cases and a review of the literature. The objective has been attained, and the book will be of inestimable value to all those using encephalography as an aid in diagnosis. The excellent bibliography offers ready access to information upon all aspects of encephalography. To neurologist, neurological surgeon, psychiatrist and roentgenologist this book is unreservedly recommended.

Common Skin Diseases. A. C. Roxburgh. 4th ed., 402 pp., illust., 15s. net. H. K. Lewis, London, 1937.

With a new edition of this book the author has again fulfilled the purpose which he originally set out to accomplish, *viz.*, to provide the medical student and general practitioner with a textbook of common skin diseases "described from the point of view of diagnosis, and such treatment as the general practitioner is in a position to give". After a short introduction the author enters at once into two excellent chapters on general signs, symptoms, diagnosis and treatment, complete with carefully worded definitions of the common terms peculiar to dermatology. The various types of treatment in general usage are explained, with diet, drugs, local applications, physical methods and radiation receiving suitable attention. Twenty succeeding chapters are devoted to a consideration of the skin conditions which in the author's opinion the general practitioner may be expected to recognize and treat in the course of the daily round. Printed in an easily readable form on high-grade paper, and profusely illustrated with excellent photographs of typical examples in each instance, the book proves that the author has admirably succeeded in facilitating accurate diagnoses, on which basis alone successful treatment can be carried out. To the library of the student, the general practitioner, and the busy dermatologist, Roxburgh's "Common Skin Diseases" is a welcome addition.

Clinical Parasitology. C. F. Craig, and E. C. Faust. 733 pp., illust., $8.50. Lea & Febiger, Phila., 1937.

A book on parasitology by Dr. Craig needs no introduction. There is no doubt that we are becoming more and more aware of the fact that parasites, the prevalent etiological agents of human disease in the tropics, cause us serious concern in the temperate zones. In this volume the authors have attempted, with considerable success, to present in clear, concise form the most important facts concerning animal parasites of man; diseases which they cause and the most approved methods of diagnosis, treatment and control. The book is divided into three sections, the first of which deals with protozoa and protozoan infections, discussing clearly the class, family and genus. Each parasite is discussed under synonyms, history and nomenclature, geographical distribution, morphology, habitat, life cycle and method of reproduction, cultivation, epidemiology, methods of transmission, pathology and symptomatology, diagnosis, prognosis, treatment and prevention. The second chapter deals with helminths and helminthic infections, discussed in the same manner. Section 3 deals with arthropods and human disease. It is far the best ever presented in books of such kind and most interestingly treated.

The book closes with a technical appendix on the collection, preparation and identification of parasites and also a complete list of literature on clinical parasitology.

The book is intended not only for practising physicians but also for students in medical schools. It will be widely welcomed.

Modern Treatment in General Practice. Vol. 3. Edited by P. G. Wakeley. Editor of "The Medical Press and Circular". 436 pp., illust., $3.00. Macmillan Co., Toronto, 1937.

The first two volumes of this series were favourably reviewed in the *Journal* some time ago, but this new volume surpasses the others in every way. Articles written by men at the very top of the profession touch almost every phase of the many divisions of medicine. Some of these contributions are outstanding, such as the first three:—the surgical treatment of cancer of the stomach by Gordon-Taylor; the treatment of cirrhosis of the liver, by Sir Humphry Rolleston; and the treatment of cholecystitis, by Sir David Wilkie.

Gordon-Taylor is most frank about his lack of success in excision of the stomach, and is at a loss to account for the lower mortality on the Continent and in America. His operative mortality in 122 resections of the stomach is 34 per cent and only 9 patients lived for five years or more out of 80. Yet his mortality in gastrectomy for ulcer is only 3 per cent.

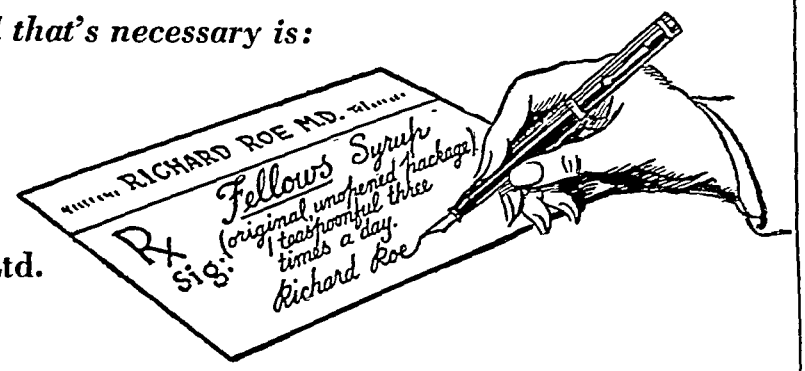
Negus (King's College Hospital) has found the most suitable treatment for carcinoma of the œsophagus is the implantation of radon seeds, 1.8 millicuries each, using the œsophagoscope and the fluoroscope, but he gives no statistics of his results.

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Lockhart-Mummery writes a masterpiece on the treatment of cancer of the colon, and Grey Turner another on intestinal obstruction.

The whole book is a "refresher" course from which anyone interested in medicine can gain most valuable help. There is nothing else quite like it in English.

Legal Medicine and Toxicology. T. A. Conzales, M. Vance and M. Helpern. 754 pp., illust., $10.00. D. Appleton-Century, New York, 1937.

This is a work which is of more than ordinary importance in its sphere. Written by men of recognized standing in their special field and having immense experience it may be accepted as accurate, comprehensive, dependable and practical.

There is no excessive detail. In the domain of highly specialized procedures the methods are described only sufficiently fully to impress upon the physician the nature of these examinations, their applications and their limitations, and the precautions which should be taken in any given case to ensure the success of the investigation. Pathological conditions receive more than ordinary attention, for the authors regard these as the basic considerations in the majority of medico-legal problems. Within recent years the field of medico-legal investigation has widened considerably and the book takes full cognizance of this fact. New industrial hazards are dealt with, also the newer poisons, the injuries caused by automobiles, gangsters, bombs, poison gas, roentgen-rays and radium. Finger-printing and ballistics are discussed briefly and the theory and application of the iso-agglutination tests on human blood, more fully. For the rest, the subjects usually dealt with in textbooks of this character are considered adequately. The legal aspects of the subject are not emphasized; such subjects as the corpus delicti, the various responsibilities of the physician, malpractice, insanity and insurance are discussed as problems which may arise in the professional life of any physician. A feature worthy of special praise is the free illustration.

This book is an excellent guide in teaching, not only in medical colleges but in police schools and criminological laboratories; it should be the daily handbook of the coroner, the coroner's physician, the medical examiner, the pathologist and toxicologist; it will provide a wealth of information for the internist, surgeon, those interested in occupational diseases, the legal profession and criminologists.

Drug Addiction. E. W. Adams, O.B.E., M.D. 173 pp., $2.75. McAinsh, Toronto, 1937.

This book is a compact, well-balanced monograph, giving a survey from both the medical and social aspects of a problem concerning which accurate information is desirable for the reader who is apt to be confused by the vast amount of writing on the subject. The classification and definition of addiction, with a review of the addiction drugs, is balanced by an admirable historical sketch which emphasizes the fact that a narcotic may only be assessed accurately after a long period of use. The important considerations concerning addiction drugs in which the non-expert reader will be most frequently interested — the prevalence, factors in creation of the habit, treatment and prognosis—are handled with great skill and accuracy. The medical reader will be particularly interested in the discussion of the mechanism of tolerance and the symptoms of withdrawal, the admirable discussion of the rôle of the medical practitioner in creating addiction, and the outline of treatment in which the author properly stresses the two stages in treatment, disintoxication and rehabilitation — freeing the patient from his drug and then freeing him from himself. Probably the best chapter in the book is the balanced discussion of the all-important question of prognosis, a summary of opinion which should be read by every medical man. The book provides an invaluable compendium of current opinion on a subject which is engaging the attention of the medical profession and the public in all lands at the present time.

Feeding Behaviour of Infants. A. Gesell, Ph.D., M.D., Sc.D., and F. L. Ilg., M.D. 201 pp., illust., $5.00. J. B. Lippincott, Toronto, 1937.

This volume is based upon an intensive study of the feeding behaviour of normal infants from birth to three years of age. Thirteen children were intensively studied and 80 less intensively, both through the Yale Clinic and through home observations. It is profusely illustrated by numerous photographs showing various aspects of the behaviour patterns.

The first section deals among other things with the motor mechanisms involved in feeding and the patterns of general development at various age levels. The middle section deals with breast, bottle, cup, and spoon feeding at various ages, and is analyzed under three headings: the adjustment to the presentation of food; the patterns of feeding; and the evidences of satiation. The last section is devoted to the regulation of feeding behaviour. It deals in a practical aspect with feeding and sleeping schedules; breast, bottle and solid feedings; weaning; thumbsucking; bladder and bowel control. The appendix consists of four cases described in detail to illustrate the above points. The authors believe that for each infant the feeding schedule, time, amount, and, to some degree, the type of food, should be based upon the child's demands and not upon a planned schedule based upon the average child. Such a routine would abolish the contest between the infant and the parent, with its emotional disturbances, and would produce a more stable child, by avoiding want, anxiety and distress. They consider that few people realize that bladder and bowel control depend upon the normal maturation of the nervous control of the bladder as well as upon the training of the child. Few parents consider the development of this control as non-emotionally as they consider the development of walking. The book is mainly of value to the psychologist, though every physician interested in infant feeding should read the chapters upon the regulation of feeding behaviour.

Biological Time. P. Lecomte du Noüy, Chief of Division of Molecular Biophysics, Pasteur Institute, Paris. 180 pp., illust., $2.00. Macmillan Co., Toronto, 1937.

The title of this book hardly indicates the appeal that its contents should have to medical readers, even apart from its main thesis. The author tells how, in France during the Great War, he arrived at his well known method of evaluating antiseptics in wound-healing. This personal account of stages in experimentation and analysis should be valuable to beginners in research, and, in spite of one or two difficult formulæ, the general medical reader will appreciate how elementary mathematics is the natural and necessary method of solving important practical problems.

For the uninitiated the reference to indeterminacy in physics is probably either too brief to be understood or too suggestive of finality among the experts, but this excursion does not occupy a central position in the argument. The discussion of relativity and concepts of time, with quotations from Karl Pearson, Bergson and others, may seem rather abstruse for many readers, but it illustrates how modern biology, even more cogently than modern physics, modifies traditional philosophy; and its important practical lesson is that astronomical time, by which we conduct our daily affairs, is not necessarily so "real" or so uniform as is commonly supposed, and that for each individual "physiological" time is more vital, the time that is measured by the activity of his tissues and body fluids. Dr. Carrel's

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foreword emphasizes the bearing of this on family life, education and clinical medicine.

The subject-matter, viewed as a whole, is an answer in the Pasteur tradition to those biologists and others who despise research that is initiated to solve practical problems, and it may remind some pre-clinical teachers that in medicine the natural method of approach to pure science is by way of clinical problems.

Marriage and Periodic Abstinence. J. G. H. Holt, M.D. 174 pp., $2.75. Longmans, Green, Toronto, 1937.

This book bears only one resemblance to the Victorian novel, and that, the possession of a sub-title. In this case the secondary title is "The Natural Method of Scientific Family Regulation". Dr. Holt reviews the growth of knowledge of the relation of ovulation to the menstrual cycle and the consequent periodicity of fertility and sterility. Particular tribute is paid to the work of Dr. Kyusaku Ogino, of Japan, and to the European investigators, Knaus and Smulders. The author has been associated with Dr. Smulders in the clinical application of Ogino's theory and from this experience is able to give definite instruction as to its use as a method of contraception. He stresses the importance of the calculation of the period of fertility of each individual patient, and provides tables and a slide-rule for this purpose. The book is supplied with an extensive bibliography, and is written in a lucid and convincing style. All gynæcologists and many general practitioners will be interested in this masterly scientific exposition of what is called the "Safe Period" theory.

National Health Series. By various authors. 20 volumes, each 100 pp. Revised editions; cloth, 35c. per copy—3 volumes $1.00. Funk & Wagnalls Co., New York, 1937.

Adolescence, M. A. Bigelow; Cancer, F. Carter Wood; Common Cold, W. G. Smillie; Common Health, J. A. Tobey; Diabetes, J. R. Scott; Exercise and Health, J. F. Williams; Expectant Mother and Her Baby, R. L. DeNormandie; Food for Health's Sake, L. H. Gillett; Healthy Child, H. L. K. Shaw; Hear Better, H. G. Rowell; How to Sleep and Rest Better, D. A. Laird; Human Body, T. B. Rice; Love and Marriage, T. W. Galloway; Staying Young Beyond Your Years, H. W. Haggard; Taking Care of Your Heart, T. S. Hart; Tuberculosis, H. E. Kleinschmidt; Venereal Diseases, Wm. F. Snow; What You Should Know About Eyes, F. P. Lewis; Why the Teeth, L. M. S. Miner; Your Mind and You, G. K. Pratt.

These little volumes are written by members of the National Health Council, an organization which correlates the activities of many of the medico-sociological movements in the United States. They are intended for the laity, and admirably fulfill their purpose in giving helpful and authoritative information regarding personal and community health. Many physicians will find these books useful to give or to recommend to a patient who is intelligent enough to desire printed information about his own condition. No attempt is made to encourage self-diagnosis or self-treatment, and the volumes largely avoid that cardinal sin of the doctor who writes for the lay reader, namely, "talking down". This list covers the field which was contemplated for the "What You Should Know About" series started under the auspices of the Canadian Medical Association, and which came to an untimely end after the publication of four volumes. The sensible and reasonable opinions expressed by the authors in "Common Cold" and "Exercise and Health" call for particular commendation.

Personality and the Cultural Pattern. J. S. Plant, M.D. 432 pp., $2.50. Commonwealth Fund, New York, 1937.

Dr. Plant attempts to summarize here the interreactions between the personality and the cultural milieu in which the individual lives. The fact that environmental influences determine to a large extent human behaviour has, of course, been accepted by those whose primary interest it is to deal with abnormal behaviour. It is probably true, however, that the physician who attempts to treat mental disorder has over-emphasized the importance of defects within the personality structure of the patient and minimized the rôle played by the social environment. The extensive clinical material and social data presented in this book clearly illustrate the point of view set forth. The first part of the book is devoted to a discussion of the changing concepts of the personality and the personality-culture balance. Then follows a discussion of the results of the conflict between personality needs and various environmental pressures. Particular emphasis is placed on the family, the school, and the social problems in urban areas as related to personality development. The author's social philosophy as presented here, his emphasis on the results of preventive efforts in this field, and his discussion of the significance of psychogenic illness should make this book particularly valuable to the medical profession.

Our Children in a Changing World. E. Wexberg, M.D. and H. E. Fritsch. 232 pp., $2.00. Macmillan, Toronto, 1937.

In this book the authors attempt to portray some of the commoner behaviour problems in children. They discuss in considerable detail the treatment of such symptoms as anxiety, fears, feeding problems, disturbances of speech, and other manifestations of maladjustments in children. Numerous case illustrations are used to exemplify the methods of treatment advocated. The authors indicate in the introduction to this book that their approach to the treatment of child problems is essentially that of Adler's "Individual Psychology". This accounts for the frequent over-simplification of the facts involved in many of the problems discussed and the rather superficial treatment procedures employed. There are numerous helpful suggestions which should be of special value to those who are particularly interested in the treatment of children.

BOOKS RECEIVED

The History of the Acute Anthemata. J. D. Rolleston, M.A., M.D., F.R.C.P., F.S.A., Medical Superintendent, Western Fever Hospital, London. 114 pp., $2.25. Wm. Heinemann, London; Macmillan, Toronto, 1937.

Physicians and Medical Care. Esther L. Brown, Department of Statistics, Russell Sage Foundation. 202 pp., $0.75. Russell Sage Foundation, New York, 1937.

Paget's Disease of the Nipple. Keith Inglis, M.D., Ch.M., Professor of Pathology, University of Sydney. 233 pp., illust., $11.00. Oxford University Press, London; McAinsh, Toronto, 1936.

Clinical Electrocardiography. Sir Thomas Lewis, M.D., F.R.S., D.Sc., LL.D., F.R.C.P., C.B.E. 6th ed., 128 pp., illust., 8s. 6d. net. Shaw & Sons, London, 1937.

Emotional Adjustment in Marriage. Le Mon Clark, M.S., M.D., Assistant in Obstetrics and Gynæcology, University of Illinois. 261 pp., $3.75. McAinsh, Toronto, 1937.

The Harvey Lectures. Delivered under the Auspices of the Harvey Society of New York. Series 23. 245 pp., $4.00. Williams & Wilkins, Baltimore, 1937.

The Patient and the Weather. W. F. Petersen, M.D. and M. E. Milliken, S.M. Vol. 4, part 2, Organic Disease. 729 pp., $11.00. Edwards Bros., Ann Arbor, Mich., 1937.



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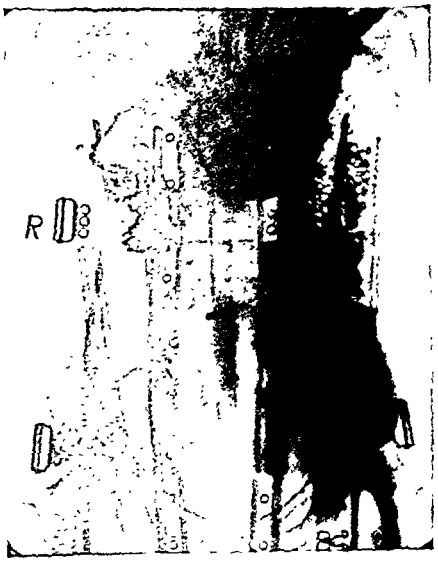
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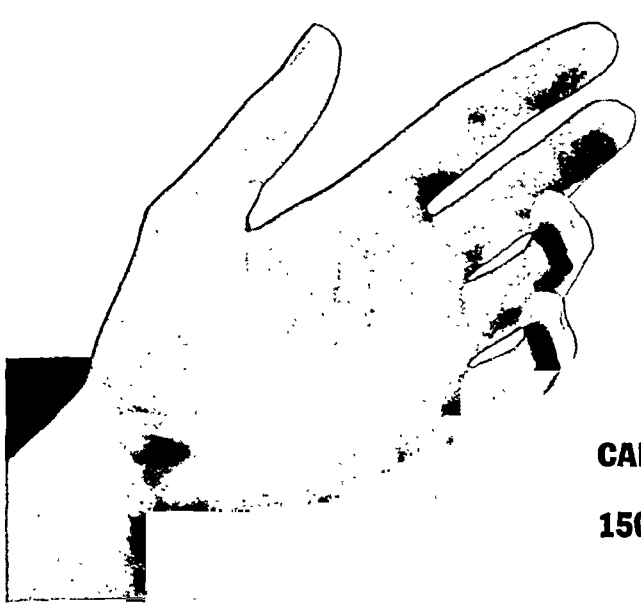
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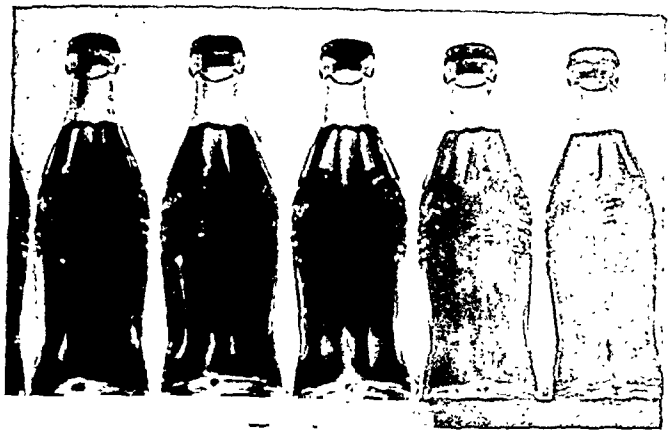
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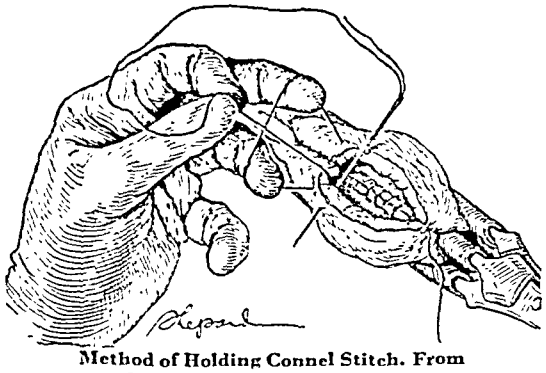
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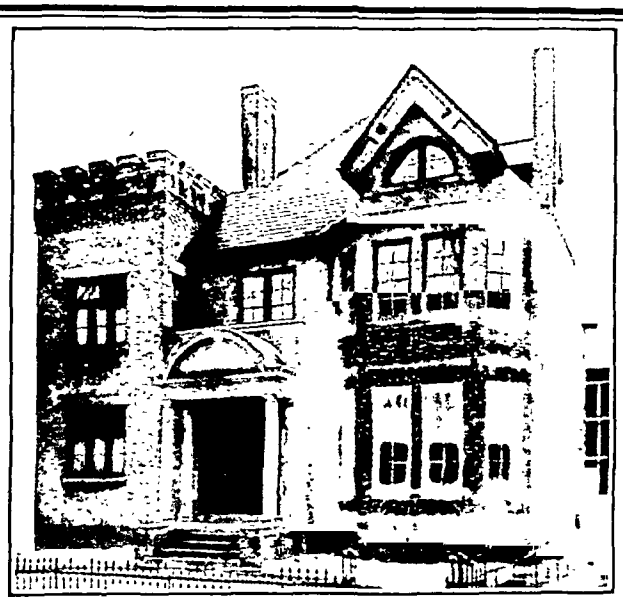
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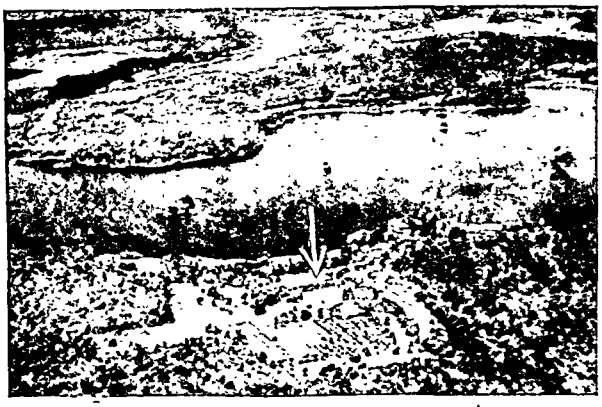
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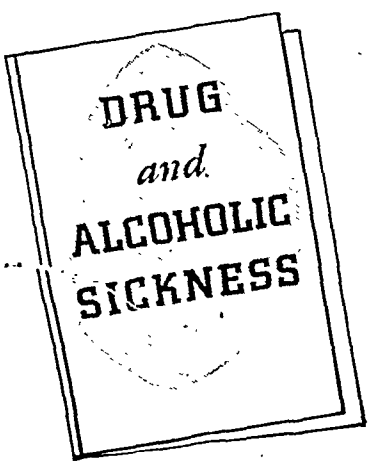
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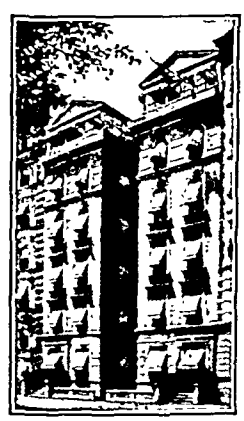
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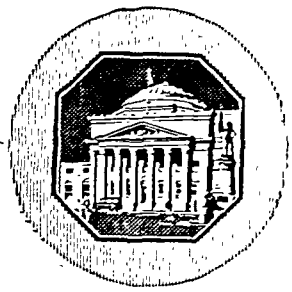
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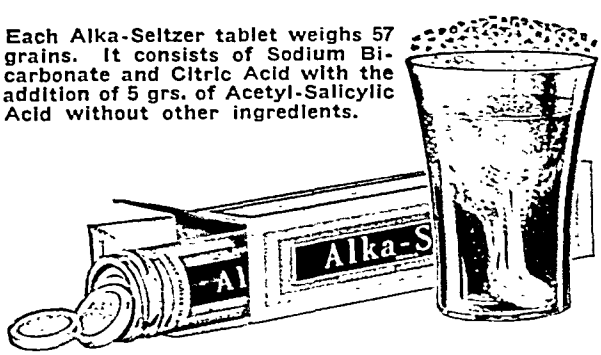
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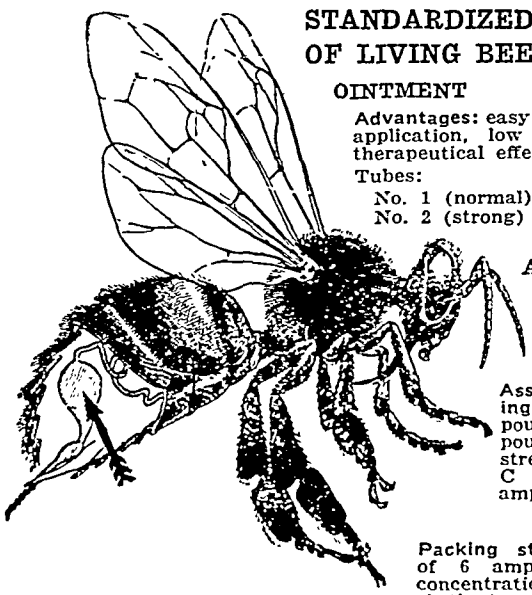
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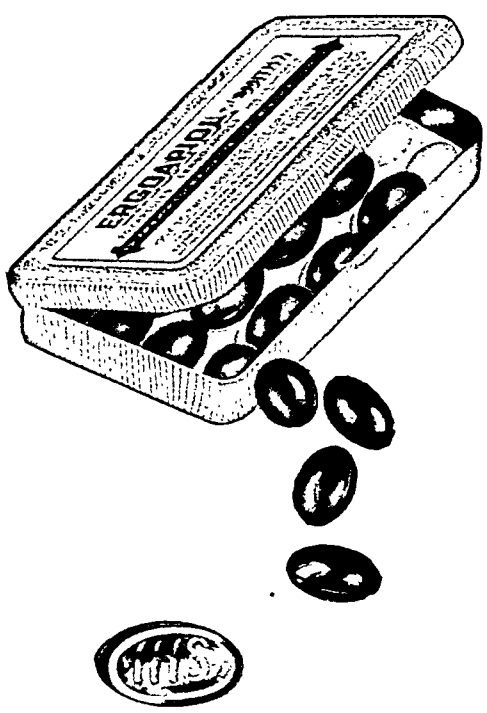
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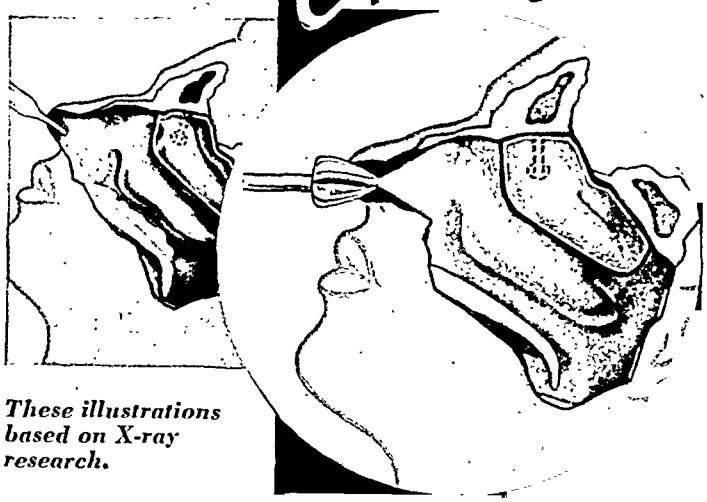
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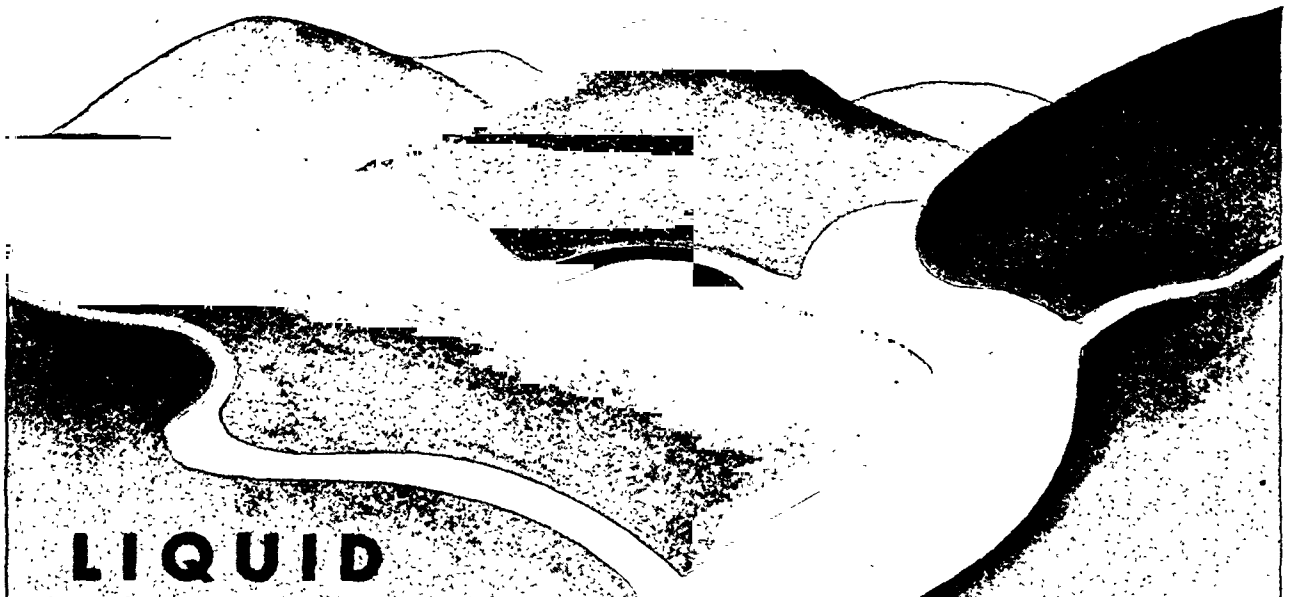
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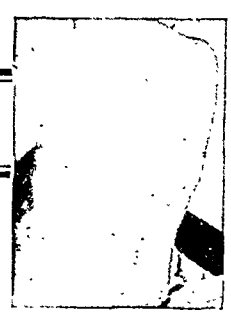
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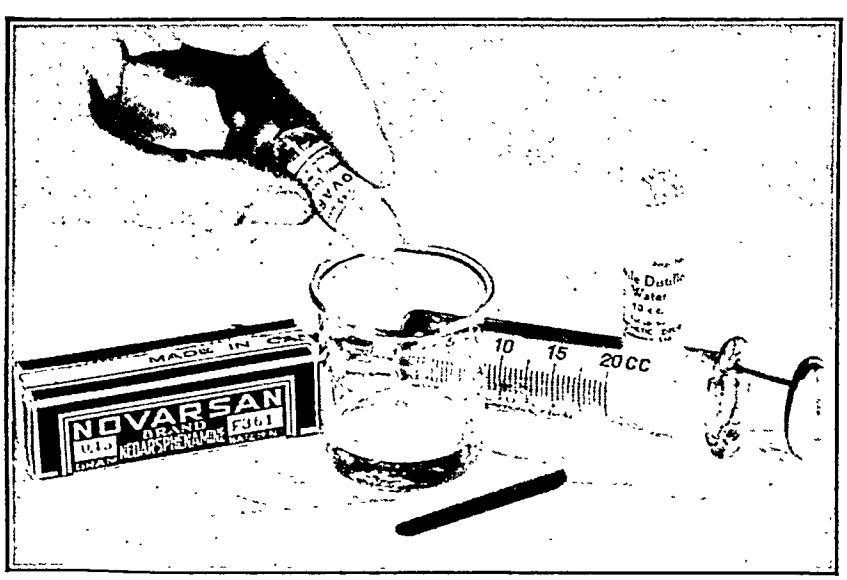
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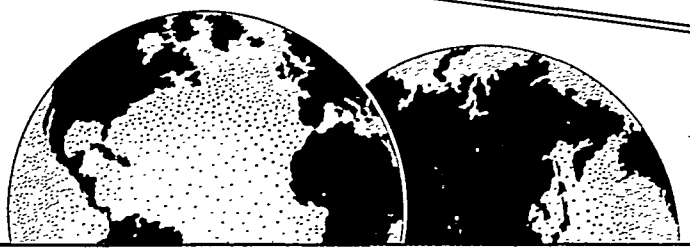
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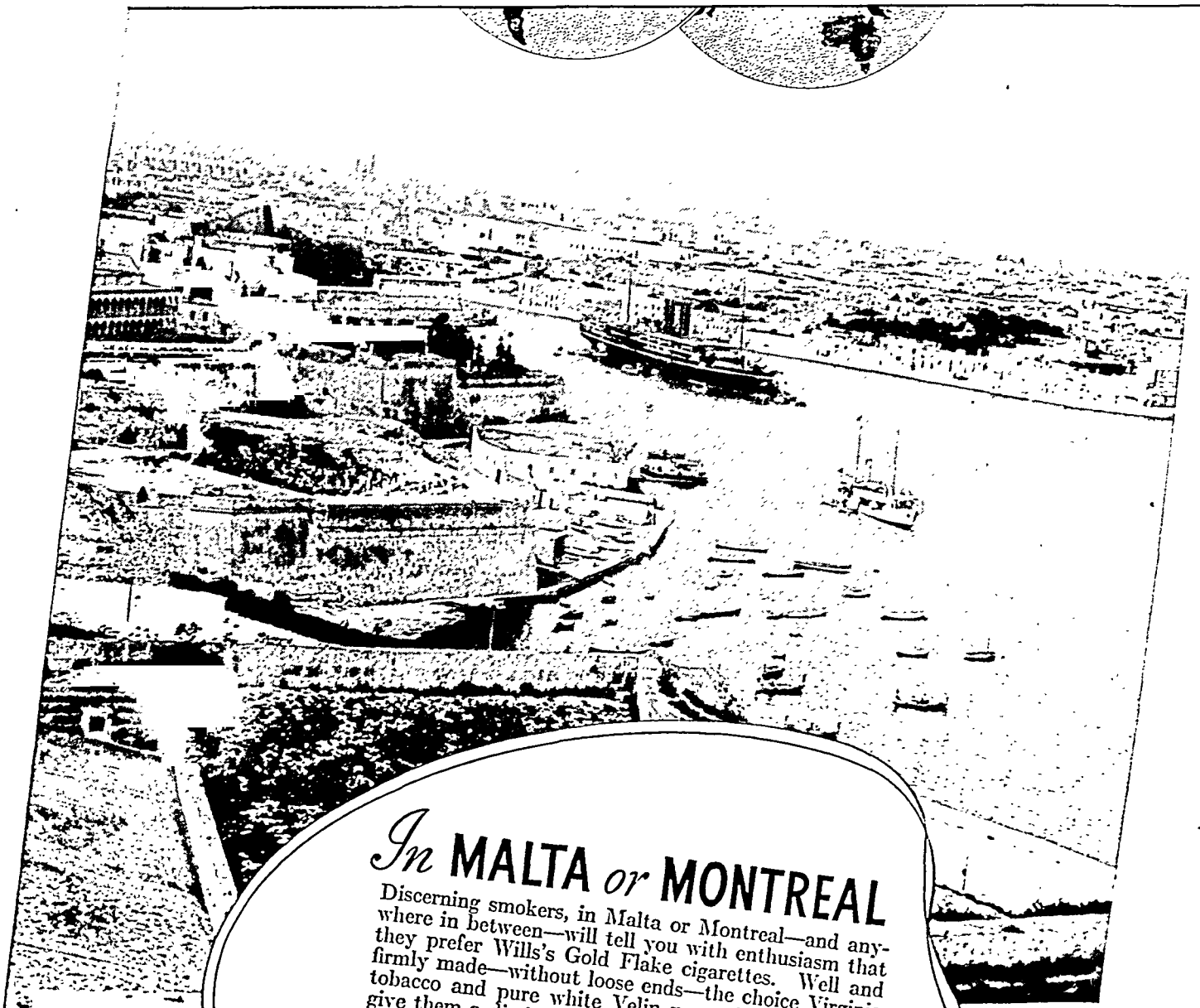
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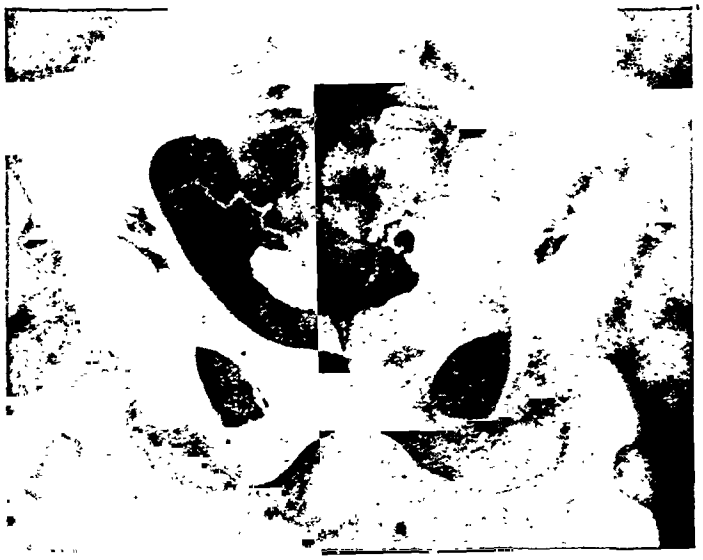
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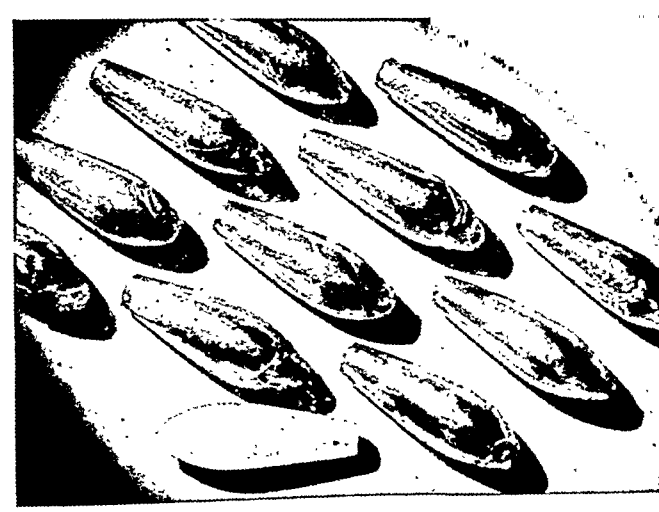
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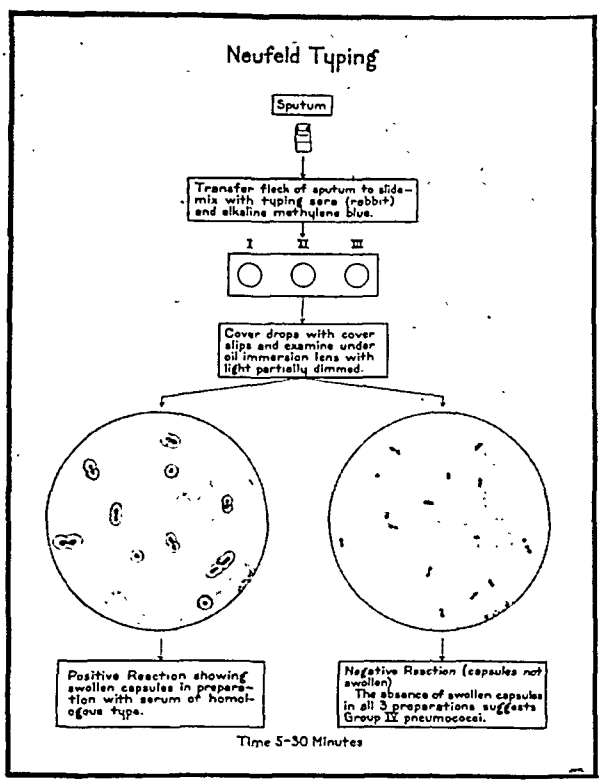
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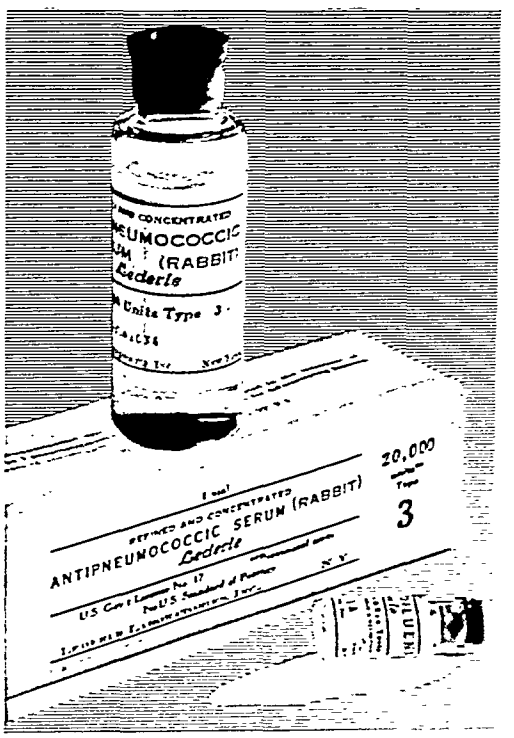
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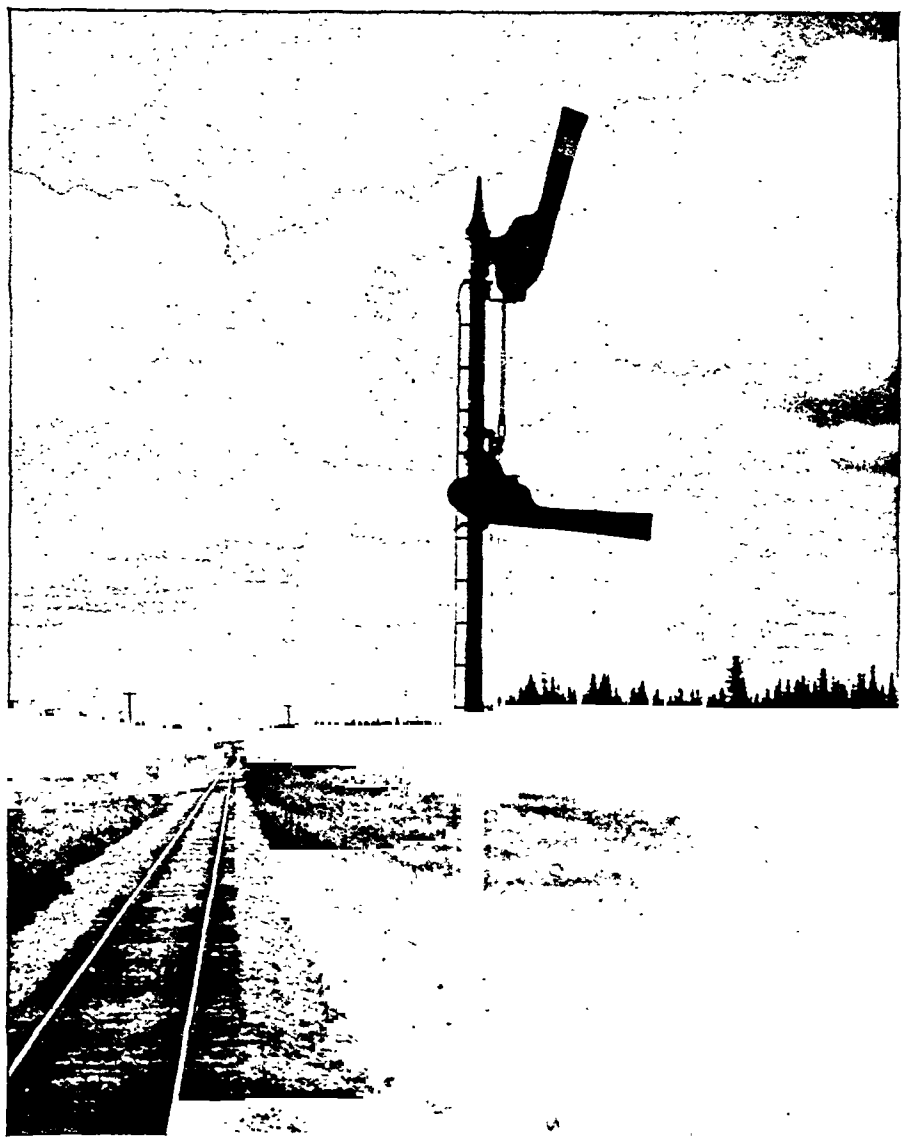
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The Treatment of Parkinson's Disease and Parkinsonian Syndromes

GENOSCOPOLAMINE

Polonovski and Nitzberg

Of all the drugs which have been recommended for the treatment of Parkinson's Disease and Parkinsonian Syndrome, few have given such good results as Hyoscine. With this drug, rigidity and hypersalivation, which are such distressing features, are often strikingly ameliorated. The disadvantage of Hyoscine, however, lies in its toxicity, in the narrow margin between the therapeutic and the lethal dose, and in the fact that, after continuous administration, a tolerance to the drug is established, and a habit formed which is often hard to break.

Much work has recently been done in the attempt to find a substitute for Hyoscine, as effective therapeutically, but less toxic. This has at last been accomplished, and we now possess a new and valuable drug for the treatment of paralusis agitans and post-encephalitic Parkinsonism.

GENOSCOPOLAMINE

This drug, which is called Genoscopolamine, we owe to the work of Polonovski, Combemale and Nayrac. It is the N-oxide of Scopolamine, the formula of the hydrobromide being $C_{17}H_{28}O_5NHBr$. In this compound, which is one of the series of genalkaloids, oxidation of the amine group has the effect of lessening toxicity by retarding absorption in the central nervous system. The pharmacological properties are not only maintained, but are even enhanced. Genoscopolamine has the great advantage over Scopolamine of being 200 times less toxic, the lethal dose in animals being 0.25 gm. per kilo. of weight, as against 0.001 gm.

Therapeutically, in Parkinson's disease and the Parkinsonism of encephalitis lethargica, the results are striking, being *more definite, more general, and more lasting with Genoscopolamine* than with Hyoscine. This is, no doubt, partly due, at any rate, to the fact that, being less toxic, Genoscopolamine can be employed in larger doses and for longer periods.

The following cases may be quoted in illustration:—

CASE I.—Female, aged 25. Severe post-encephalitic Parkinsonism; fixed attitude, rigidity and tremor, loss of automatic movements. Given 5 mgm. of Genoscopolamine daily in the form of drops. Rapid improvement, both subjectively and objectively; rigidity and tremor less, and patient able to move her arms. Hypersalivation disappeared after the tenth day.

CASE II.—Female, aged 30. Post-encephalitic Parkinsonism. 2 mgm. of Genoscopolamine given daily, in the form of drops. Immediate improvement; rigidity less, tremor disappeared. On increasing the dose to 3 mgm., patient improved still more, moving about quite easily. Then, unknown to her, the drug was stopped; the symptoms reappeared, but disappeared on again giving the drug. Hypersalivation ceased after the eighth day.

CASE III.—Male, aged 32. Very severe Parkinsonism. Complete rigidity and fixity of movement. Given 3 mgm. Genoscopolamine daily; remarkable improvement after two days. The patient became cheerful, and could walk about and move his arms. On stopping the drug, the symptoms recurred, but disappeared again on re-administering it.

CASE IV.—Female, aged 35. Typical Parkinsonian syndrome, no previous history of encephalitis lethargica. Treated by all the usual, including Hyoscine, without improvement. On 3 mgm. daily of Genoscopolamine, hypersalivation immediately became less, and the movement free. The patient is still taking 2 mgm daily, and is able to follow her occupation.

CASE V.—Female, aged 53. Parkinsonian syndrome, no previous history encephalitis lethargica. Treated by 5 mgm. of Genoscopolamine daily. At first the patient became mentally confused, but this soon disappeared. The tremor has been much less marked for the last four months. The condition improved still more on associating 3 mgm. of Genhyoscyamine with 2 mgm. daily of Genoscopolamine.

Other cases of a similar nature could be quoted.

SUMMARY

Genoscopolamine is a drug which has remarkable therapeutic effects on the various components of the Parkinsonian syndrome.

(1) It relieves muscular hypertonia and rigidity, and restores the use of the limbs.

(2) It attenuates the tremor, often to a considerable degree.

(3) It is the most effective drug for relieving the distressing hypersalivation.

(4) It has some, though, inconstant, effect on the disturbances of automatic action. These are notoriously rebellious to treatment, but if taken early are often much improved by *Genoscopolamine.*

TOXIC SYMPTOMS

Secondary effects are rarely observed, and are seldom of any importance. Occasionally, in susceptible patients, there may be some mental confusion or slight excitability, with congestion of the face and visual hallucinations. Diarrhœa, too, may be a troublesome symptom. These disturbances, however, are usually only seen when relatively high doses (4-5 mgm. in one dose) are prescribed. They do not recur, and seem to be associated with the first dose only.

With Genoscopolamine there is no risk of habit-formation. It is unnecessary to increase the dose to maintain a therapeutic effect. Indeed, when, after a little trial, the correct and necessary dosage for the patient has been discovered, it may be continued indefinitely, or even reduced a little.

DOSAGE

The average dose is 3-4 mgm. daily, although this may be increased if necessary.

It is best to give Genoscopolamine in fractional dose of 1-2 mgm. two or three times through the day. One can thus give 1 mgm. three times daily or 2 mgm. night and morning or 2 mgm. in the morning, and one more in the afternoon and evening; the morning dose should be the largest given.

PACKING

Genoscopolamine is put up as the hydrobromide, in the following forms:—Granules of ½ mgm. The dose is 4-8 granules daily.

Drops of a 1.5 per 1000 solution. The dose is 40-80 drops daily, in two or three fractional doses.

Ampoules containing 1 mgm. Give one ampoule subcutaneously if an immediate effect is desired. The dose may be supplemented by giving the rest of prescribed daily amount as granules or drops.

For surgical use, and for special emergencies, where it is desired to take advantage of the anæsthetic and hypnotic properties of Genoscopolamine, this is put up in form of ampoules containing 3 mgm. to the c.c.

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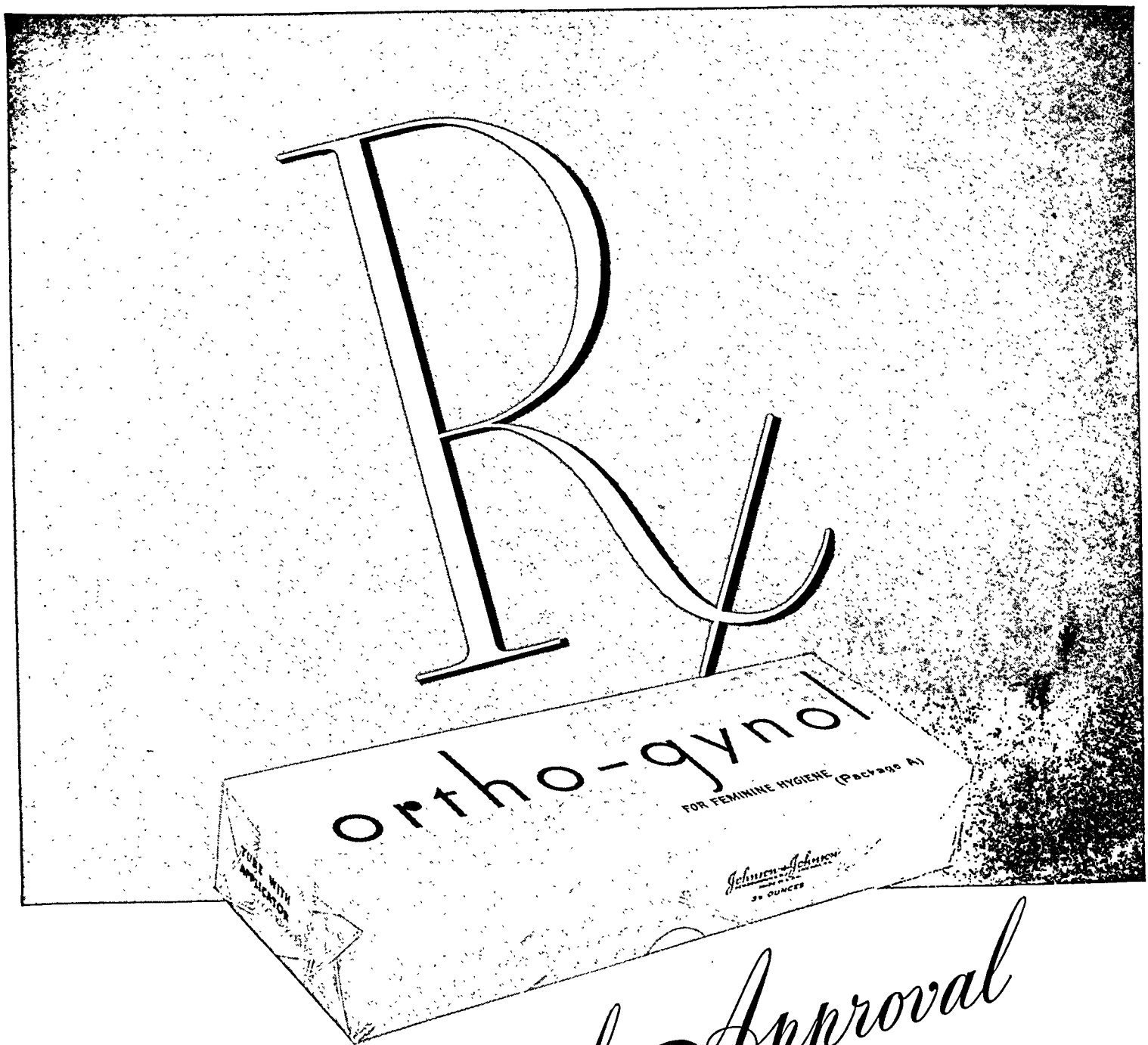
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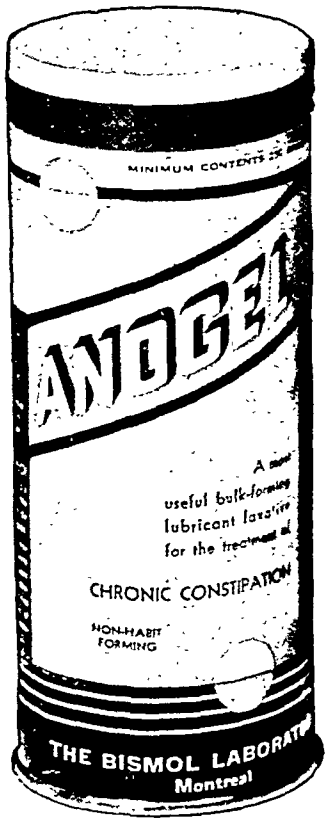
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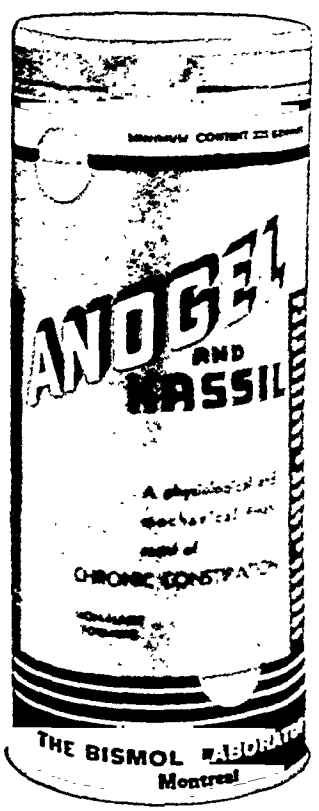
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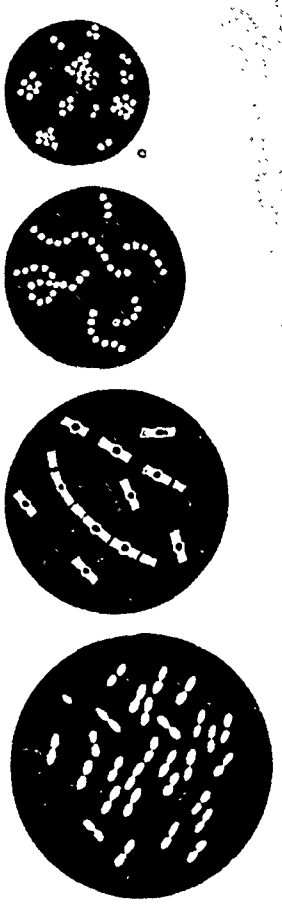
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The Canadian
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Vol. 38 TORONTO, FEBRUARY, 1938 No. 2

CARCINOMA OF THE RECTUM AND RECTO-SIGMOID

(A REPORT OF 89 CASES WITH SPECIAL REFERENCE TO ELECTRO-COAGULATION IN SELECTED CASES)

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AND

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Assistant Surgeon, Winnipeg General Hospital

CANCER of the rectum is a disease which can be diagnosed accurately. The growth is usually of low malignancy, is slow to metastasize, is more or less accessible, and hence is amenable to surgical extirpation. Two chief obstacles bar the way to the attainment of a high record of cures. First: rectal bleeding, the earliest and most constant symptom of cancer, is ignored, being associated in the minds of the laity with hæmorrhoids, its most common source. Second: rectal examination is not always regarded by the profession as an essential part of a complete routine physical examination. The significance of these two facts cannot be too greatly emphasized. It is regrettable that an average of nine to thirteen months elapse before patients seek advice, and that all too often treatment is given for hæmorrhoids, when the insertion of a finger into the rectum would lead to the diagnosis of carcinoma.

Even when the diagnosis is made early there are still barriers to the institution of adequate treatment. Cancer of the rectum is too often regarded as hopeless, not only by the laity but by some members of the profession as well. The former can scarcely imagine life to be compatible with the removal of the rectum, and regard a colostomy as an intolerable makeshift. The latter hesitate to advise radical treatment, because they envision a mutilating operation, a prohibitive mortality rate, a prolonged painful convalescence, and a high rate of recurrence. The removal of the rectum and the formation of an adequately functioning colostomy is surely not as mutilating an operation as the amputation of a limb. A mortality rate of 9 to 25 per cent in an otherwise lethal disease is not prohibitive. A month or two in a hospital is surely greatly to be preferred to the inevitable many months of cramps, diarrhœa, tenesmus, and intolerable rectal and pelvic pain, before the end comes. And finally, figures such as Miles'[1] 33.7 per cent of five-year cures, and Rankin's[2] 24.1 per cent of ten-year cures, cannot be said to exhibit a high enough rate of recurrence to discourage either the patient from accepting, or the surgeon from applying, adequate radical treatment.

To duplicate results such as Miles and Rankin have obtained one must possess a thorough knowledge of the anatomy of the large bowel and pelvis, of the pathology of carcinoma in the sites under discussion, of the clinical signs and symptoms, of special methods of investigation, and finally of the indications for and the end-results achieved by the various surgical methods.

ANATOMY

The rectum is from five to six inches long. It lies in the hollow of the sacrum, and extends from the third piece downward and forward to join the anal canal about one and a half inches in front of the tip of the coccyx. It is encased in a loosely-attached sheet of pelvic fascia, thin above the ampulla, more dense around the ampulla. Between this layer and the longitudinal muscle coat lie the retro-rectal and para-rectal lymph glands. These are generally the first to be invaded by disease arising in the rectum. The upper third of the rectum is covered with peritoneum anteriorly, the sides

are only partially covered as the peritoneal reflection slopes forward and downward. The rectum is narrowed above at its junction with the sigmoid. The two coloured plates (Figs. 1 and 2) illustrate the two types of recto-sigmoid that are encountered. A growth in the ampulla may be relatively advanced before causing obstruction, while a tumour at the recto-sigmoid junction produces early obstruction.

The arterial blood supply and the venous drainage of the rectum and anus consist of the superior, middle and inferior hæmorrhoidal vessels. The superior hæmorrhoidal artery is located in the meso-sigmoid just in front of the sacral promontory, slightly to the left of the mid-line, and lies close to the left ureter. The proximity to the ureter usually does not give rise to difficulty during operation, as the vessels pull away from the ureter when the sigmoid is lifted out of the pelvis. The superior vessels supply and drain all of the rectum except a portion of the anterior wall in relation to the prostate or vagina. The latter portion is supplied by the middle group. The anal canal is supplied by the inferior group. There is a free anastomosis between all three groups and they communicate with both the systemic and the portal circulations.

The lymph drainage corresponds to the venous drainage, and is of course important in the spread of malignancy. There are three mural plexuses, one in the submucosa, one between the circular and longitudinal muscles, and one outside the longitudinal coat. The circular arrangement of these lymphatics, and also the fact that tumour cells first invade the circular muscle coat, explain the annular character of many large bowel tumours. Further details of the lymphatic spread will be discussed under the heading of pathology.

It is important to remember that the ureters are closely related to the rectum. They lie roughly one and a half inches from the side of the rectum as they pass downward and forward from the bifurcation of the common iliac artery. They adhere to the pelvic peritoneum until the ischial spine is reached, and then turn medially to be crossed superficially by the ductus deferens in the male, and the uterine artery in the female. They empty into the bladder about an inch in front of the anterior surface of the terminal portion of the rectum.

PATHOLOGY

Pre-cancerous lesions.—While adeno-carcinoma may arise from apparently normal tissue, there exists strong evidence to support the view that many malignant growths of the large bowel have their origin in pre-existing adenomatous polypi. The distribution of cancer, eight times as frequent in the sigmoid and rectum as in other portions of the bowel, corresponds closely to the distribution of polypi.

A recent case of congenital polyposis of the colon, in a boy of 22, had moderately advanced carcinoma of the rectum when first seen (Fig. 1). His mother, two brothers and three sisters out of a family of thirteen have diffuse polyposis. In 1919 Dr. Neil John Maclean[3] reported the case of a woman of 24 years with advanced rectal carcinoma. Her two brothers had died of carcinoma of the bowel at the ages of 7 and 11 respectively. These were undoubtedly examples of malignant change in *congenital polyposis.*

Single polypi are also pre-malignant.

A man aged 53 was found on routine examination for hæmorrhoids to have two benign polypi of the sigmoid. In the family history it was noted that one brother had died of carcinoma of the colon at the age of 60, and another brother had been operated upon for carcinoma of the recto-sigmoid a year previously.

Another patient reported ten years ago with acute obstruction of the transverse colon which was thought due to intussusception because of the history, examination, x-ray evidence of obstruction, and the fact that he obtained dramatic relief of symptoms during the administration of a barium enema. He refused operation. Five years later he returned with chronic obstruction. Laparotomy revealed a polyp of the transverse colon with moderately advanced malignant change.

Fitzgibbon and Rankin[4] reported a series of cases in which previously benign polypi had become malignant. Dukes found polypi in 75 per cent of sigmoids and recti resected because of cancerous growths. At the Presbyterian Hospital, New York, 26 per cent of cases of rectal and colonic polypi also exhibited carcinomatous lesions.

Polypi have been classified by various observers into three groups: benign, relatively benign, and malignant. The first group have long stalks and are covered by a pink shiny normal-appearing mucosa. The second group are cauliflower in type, having a granular mucosa. They are deep red in colour due to the vascularity of the thick villous processes that make up their structure. The third group are small, plump and relatively fixed on a broad base. They are a dark reddish purple colour, are often ulcerated, and they bleed readily. The first group remain benign for years. The second group tend to undergo malignant change early. The third group are malignant from the beginning.

When chronic ulcerative colitis is complicated by colitis polyposa the polypi undergo malignant change in a small percentage of cases. In one such case which came under our observation the history dated back 12 years. Rectal and cæcal carcinomata developed in inflammatory polypi.

Development and spread of rectal carcinoma.—Squamous epithelioma occurs in the anal canal but is very rare. Malignant melanoma, arising in the rectum, is rarer still. Adeno-carcinoma is by far the commonest malignant neoplasm found in the rectum and recto-sigmoid. It arises either from the crypts of Lieberkuhn or from a pre-existing polypus. In the initial stages a tumour of this type tends to grow into the lumen of the bowel. As the proliferation of cells progresses it first infiltrates the submucosa, then breaks through into the intermuscular spaces and their lymphatics. It tends to encircle the bowel rather than to spread *in*



Fig. 1.—Congenital polyposis of rectum and colon, with grade 2 adeno-carcinoma involving lower portion of rectum. (Six members of a family of thirteen had diffuse polyposis).



Fig. 2.—Large ulcerating carcinoma of the rectum, associated with multiple small polypi of sigmoid. (Symptoms eleven months' duration).



Fig. 3.—A large inflammatory tumour of the recto-sigmoid, showing multiple diverticula. The mass was honeycombed by inter-communicating tracts and there was marked peri-diverticular fibrosis. The mucosa is thrown into thick deep circular folds by the foreshortening of the bowel, the result of the fibrous contracture. These thick folds were congested and ulcerated. Patient gave a history of chronic diverticulitis extending over a period of many years (proved radiographically), but had been passing gross blood and pus for six months prior to our examination. Fig. 4.—This illustrates a recto-sigmoid tumour produced by chronic diverticulitis, a condition which may be difficult to distinguish from carcinoma. Fig. 5.—Permanent colostomy in midline. One-stage abdomino-perineal operation. Sigmoid brought out through left paramedian incision. Fig. 6.—Blind, single-barrelled no-loop colostomy, done under local anæsthesia, in debilitated patient without obstruction, as preliminary to the second-stage abdomino-perineal resection (rarely necessary). Fig. 7.—Preliminary double colostomy for obstructive lesion of the recto-sigmoid (Lahey procedure). Fig. 8.—Permanent inguinal colostomy after the second-stage abdomino-perineal operation. The first-stage done by Lahey's method.

the longitudinal axis. It has been estimated that an average tumour takes six months to grow half way around the rectum and a year to encircle it completely. The structures lying anterior to the rectum, the uterus and vagina in the female, the prostate, seminal vesicles and bladder in the male, are all liable to invasion by direct extension of a rectal carcinoma. Relentless as is the local extension of the growth, a more sinister method of dissemination may at any time take place. Lymphatic vessels become permeated, the cells travel along these to the regional lymph nodes, and thence to more distant glands. Miles has shown that the lymphatic spread may take place in three directions—downward, laterally, and upward. The downward spread occurs chiefly in tumours situated low in the ampulla or in the anal canal, but may also take place when tumours higher in the canal have blocked the upward paths. *By this route metastases may reach the inguinal glands.*

Lateral spread may occur from any tumour of the rectum. The metastases travel along the upper surface of the levatores ani outside the parietal pelvic fascia to the hypogastric glands, and occasionally to the obturator glands. The latter are situated in the obturator foramen, and are not attacked by any of the surgical methods employed for the removal of a diseased rectum. Upward spread is the most common route, since every tumour of the anus, rectum, and recto-sigmoid has direct lymphatic connections leading upward. The glands involved are the retro-rectal and para-rectal groups, the hypogastric group, and the glands of the meso-sigmoid. From the latter two groups the growth may spread to the pre-aortic and the lumbar groups of glands.

Besides the local and the lymphatic spread the tumour cells may at any time enter the blood stream and be carried by way of the portal veins to the liver. Such is the sequence of events in carcinoma from early to advanced stages, and such the formidable challenge to the surgeon who attempts its cure.

Clinically, carcinomata of the rectum and recto-sigmoid fall into three distinct types: (1) fungating; (2) annular; (3) colloid.

The fungating type is the one most commonly encountered in the rectum. It is felt as a hard nodular mass projecting into the lumen of the gut, or perhaps encircling it. If it is ulcerated, the base of the ulcer feels pultaceous, the edges hard and raised. Seen through the proctoscope, it is dark red in colour, in distinct contrast to the pale rectal mucosa or the pinker sigmoid mucosa. It is uneven in contour, and shelves off gradually into the surrounding normal surface. If ulcerated, it is covered by sloughing tissue, and it bleeds very readily on manipulation.

The annular type occurs more often in the recto-sigmoid region or upper rectum. It is felt as a firm constricting band which may or may not admit a finger, depending on the duration and the grade of the tumour. It tends to prolapse slightly into the lower rectum, and imparts to the examining finger a sensation not unlike that of a cervix uteri. It may be difficult to see through the proctoscope. Blood and perhaps mucus may be seen below it, and it may be evidenced only by a narrowing of the lumen which obstructs the passage of the instrument. Usually however one can see a dark red ring with nodular edges.

The colloid type represents the smallest group of rectal carcinomata. It is felt as a large mass, extremely bulky and friable, due to the production of mucin in the cells and its extension into the stroma. Pieces of gelatinous material often come away when the examining finger is withdrawn. Proctoscopy reveals an extensive breaking-down growth, which bleeds very readily on manipulation, and presents numerous semi-translucent nodules over its surface. These tumours are slow to metastasize but are difficult to eradicate because of their marked tendency to local invasion.

DIAGNOSIS

It is a truism that no disease can be diagnosed unless the possibility of its presence be kept in mind. The development of a cancer-consciousness in the mind of the physician is one of the greatest aids to the early recognition of this disease. Diagnosis, and particularly early diagnosis, is made by feeling and seeing the lesion, and is further established by biopsy. The history varies greatly, and for this reason one must carefully interrogate and examine every patient of cancer age who presents symptoms referable to the lower abdomen, bowel, rectum or anus. Even the most obvious case of hæmorrhoids should never be subjected to treatment until the examiner has satisfied his own mind by digital, sigmoidoscopic and x-ray examination, if necessary, that the patient's symptoms are not due to cancer.

Blood and mucus in the stools are the earliest and most constant signs of carcinoma of the bowel. Ninety per cent of our series of cases gave the passage of blood as the first indication. There may be increasing difficulty with the bowels, a history of taking more and more purgatives, lower abdominal cramps, the passage of small loose watery stools alternating with constipation, or rectal pain and tenesmus. The patient may have a loose bloody movement on rising, followed later by a more or less normal evacuation. Any of these complaints may occur in the history, or the patient may just have a vague uneasy feeling that something is wrong, without any specific symptoms. He may come complaining of "piles" which bleed or protrude, or the feeling that he is unable to empty the bowel completely. There may be general weakness, or loss of weight—but loss of weight is not an early feature of the disease.

The first evidence that anything is wrong may come with the development of large bowel obstruction, with increasing constipation, lower abdominal cramps, generalized distension and vomiting. This applies particularly to carcinoma of the recto-sigmoid. Carcinoma of the rectal ampulla may be quite far advanced before any signs of obstruction develop. In our series of 34 cases of recto-sigmoid carcinoma, 66.6 per cent were either obstructed or apparently approaching obstruction when first seen; in our series of 55 cases of rectal carcinoma

only 20 per cent were showing signs of obstruction when they came in for examination. It is significant that 92 per cent of the patients with obstructed rectal carcinoma were inoperable when they first presented themselves.

A complete physical examination should be made in every case, including digital, rectal and proctoscopic examinations. Enlarged glands in the groin should always direct one's attention to the anus and lower rectum. A mass in the lower abdomen calls for a rectal examination. Sigmoidoscopic examination should, if necessary, be repeated. If a good view is not obtained at the first attempt the patient should be given a dose of castor oil and instructed to report soon after the bowels have been thoroughly evacuated. Any case in which there is difficulty in getting the bowels cleared for examination should be regarded with suspicion, and an examination more painstaking even than usual carried out.

The clinical characteristics of the common malignant neoplasms have already been outlined. If benign polypi are present, one should remember that, according to Stout, 12 to 26 per cent of such patients will have a malignant lesion at some other point in the large bowel. Let us not be lulled into a false sense of security by assuming that the benign tumour is the cause of the symptoms, without first doing everything possible to eliminate the diagnosis of malignancy.

Biopsy.—Examination of a specimen of the tumour by the pathologist gives a great deal of accurate information, and this should be done in every case. First of all it determines definitely whether the tumour is innocent or malignant. Also it establishes the grade of malignancy. One's estimate of the best treatment to be advocated and the probable success of that treatment is influenced by the grade of the tumour. Grading is based on the degree of differentiation manifest in the cells of the tumour. The more closely the cells approach the normal structure, the lower the degree of malignancy. Regularity of the size and shape of the cells, formation of acini, production of secretion, and comparative absence of mitotic figures would place the tumour in grade 1. Extreme irregularity of the cells, both as to size and shape, absence of acinar formation, absence of secretion, and abundance of mitotic figures would place the tumour in grade 4. Characteristics between these two extremes would place the tumour in grade 2 or grade 3, depending upon the degree of differentiation.

Grade 1 tumours, if operable, have a good prognosis. Grade 3 or 4 tumours, even if operable, necessitate a bad prognosis, in view of the fact that early metastases will likely already have occurred. There is little risk of disseminating the growth by removal of the biopsy specimen, as no uninvolved tissue has to be incised. Moreover, the adjacent lymphatics are already choked with neoplastic cells and any cells liberated during the excision are not likely to progress very far.

X-ray examination.—A barium enema is not of much assistance in diagnosis. In rectal carcinoma it is unnecessary. In recto-sigmoid carcinoma overlying loops of bowel may obscure a small filling defect. A double contrast enema is of value in demonstrating lesions proximal to the recto-sigmoid.

Differential diagnosis.—The diagnosis of carcinoma in the terminal portion of the large bowel is best made by seeing and feeling the lesion. Any disease which produces a mass, an ulcer, or a stricture of the rectum, or is characterized by the passage of blood or mucus, must be considered in the differential diagnosis of carcinoma. Occasionally a tuberculous ulcer or granuloma resembles malignant disease. Tuberculosis of the large bowel is almost invariably secondary to respiratory disease. The demonstration of such disease would make clear the diagnosis of the rectal lesion. Strictures due to gonorrhœal proctitis may be mistaken for an annular growth.

Lymphopathia venerea (lymphogranuloma inguinale) is now being recognized more frequently. The rectal stricture, more common in females, is generally associated with induration extending out into the peri-rectal tissues. The inguinal lymph-nodes are enlarged and they may suppurate. Biopsy is negative for carcinoma and the Frei test is positive.

A chronic granuloma associated with amœbic infection may simulate a malignant tumour. The presence of multiple discrete ulcers, the prolonged history of diarrhœa, the possibility of exposure to the infection, and the immediate

therapeutic response to emetine hydrochloride will usually establish the diagnosis.

We have seen two cases of submucous adenomata which were proved to be benign only by biopsy and subsequent local excision of the whole tumour.

Endometriomata of the recto-sigmoid or recto-vaginal septum are sometimes difficult to distinguish from carcinomata.[11] The outstanding feature is a history of increased difficulty with the bowels during the menstrual period. The patient of course is a female. There is no rectal bleeding, no ulceration of the mucosa, and at laparotomy the tumour is found to be subserosal rather than submucosal. It does not tend to encircle the bowel, it is surrounded by numerous adhesions, and more than one tumour may be present.

The most difficult problem in differential diagnosis is presented by cases of diverticulitis involving the lower sigmoid. Usually the presence of diverticulitis is fairly easily demonstrable, but it has been shown by Spriggs and Marxner that in roughly 10 per cent of cases of diverticulitis of the colon carcinoma may also occur. Even if this figure be too high there are undoubtedly cases of diverticulitis with incipient obstruction of the colon, blood and mucus in the stools, and radiographic evidence suggesting carcinoma. In one of these cases (Fig. 3) the sigmoidoscope could not be inserted beyond the inflammatory mass, so that a view could not be obtained of the source of the bleeding. Even at laparotomy there were no criteria by which carcinoma could be definitely excluded. However, the advanced nature of the diverticulitis, the presence of a huge mass (Fig. 4) of inflammatory tissue with sinuses ramifying in the wall of the sigmoid and rectum necessitated as radical a procedure as if carcinoma had been present. It was not until the specimen was opened and examined from end to end that one could be sure no malignancy was present. Though this patient had been known to have diverticulitis for fourteen years he had been passing blood and pus with the stools for only a few months.

TREATMENT

Treatment, to be adequate, demands complete abdomino-perineal excision of the rectum and lower sigmoid colon. This dictum applies to both rectal and recto-sigmoid carcinomata. In a few rare early cases, where the growth is situated in the recto-sigmoid and is accessible, abdominal resection with end-to-end anastomosis may suffice. In our experience these cases are rare, *i.e.*, 4 in 34 cases. Another rare exception to the above dictum is the case with a malignant rectal polyp of low grade which can be dealt with by local excision or electrocautery. Three such cases have come under our observation.

The nature of the growth, its situation in the bowel, and the extent to which it has progressed are factors which subdivide the cases into three general groups: (1) those with complete obstruction; (2) those with partial obstruction; (3) those with no obstruction.

In any patient with intestinal obstruction, from any cause whatsoever, the prime requisite in treatment is the relief of that obstruction. Complete obstruction is an emergency. Accumulated toxic intestinal products must be drained, peristalsis encouraged, the general systemic manifestations of intestinal toxæmia overcome.

Cæcostomy is of chief value with patients *in extremis*, whose condition makes even the minimum of surgical interference a grave undertaking. It is only partly effective; it cannot completely empty the large bowel, nor can it prevent the periodic influx of small bowel contents into the colon. It is effective in tiding the patient over until his condition warrants the establishment of more effective drainage later on.

Under local anæsthesia a muscle-splitting incision is made. The cæcum is exposed, the surrounding structures packed off, a purse-string is introduced, and a tube is inserted into the bowel lumen. This procedure may be facilitated by first evacuating the cæcal contents and gas by means of a trocar and cannula attached to a suction apparatus. The peritoneum and muscles are closed, and irrigations can begin in a few hours' time. Any attempt at further exploration is contraindicated. In the course of a few days the inflammatory reaction at the site of the obstruction gradually recedes, and it often becomes possible to irrigate the colon through the rectum and past the obstruction. When the condition of the patient has improved sufficiently one may then proceed with whatever investigation is necessary to determine the location and the characteristics of the obstructing lesion. If these measures have been successful in relieving the

complete obstruction the patient enters the second, or partially obstructed, class.

Partially obstructed cases of rectal carcinoma present a less acute problem. In many colon cases the use of glucose drinks and mineral oil by mouth, together with repeated irrigation of the large bowel per rectum, may succeed in gradually evacuating the toxic contents of the distended colon. When this is accomplished the inflammatory œdema at the site of the tumour gradually subsides, and thus the imminent danger of a complete obstruction may be averted. The patient can then be thoroughly examined, and prepared for more deliberate and, therefore, safer surgical measures. Those patients in whom a cæcostomy for complete obstruction or conservative treatment for partial obstruction has failed to bring about sufficient improvement to warrant a one-stage operation must be advised to have a permanent inguinal colostomy. This will act as a preliminary to abdomino-perineal resection in the operable cases, or as palliative treatment in the inoperable ones.

A left-sided muscle-splitting incision is made, a free loop of the upper sigmoid is drawn up to the surface, an opening made in the meso-sigmoid, and a stiff rubber tube passed through this to prevent the bowel slipping back into the abdominal cavity. The peritoneum is closed around the bowel, but *no sutures enter the bowel wall.* The muscular layers are next brought loosely together, and a piece of gauze is placed beside the bowel down to the peritoneum. Immediate drainage of the bowel is rarely necessary. In order to facilitate subsequent opening of the bowel a double fold of its wall is grasped and crushed in curved forceps and allowed to remain for 24 to 48 hours, depending upon the degree of distension and toxæmia. After this interval the peritoneal cavity will not be contaminated when the bowel is opened. The placing of the curved forceps is an important detail. The area crushed should be in the descending arm of the colostomy (Fig. 9), so as to leave a longer loop for the colostomy opening.

Rehabilitation of the patient is accomplished by colonic irrigations, laxatives, and a liberal diet. His general health must then be built up in order to strengthen him for the ordeal of the major abdomino-perineal operation. The possibility of metastases occurring in the intervening weeks is more than offset by the reduction in operative mortality brought about by thorough pre-operative preparation. Once the obstruction is relieved and the colostomy functioning well, it is advisable to carry out

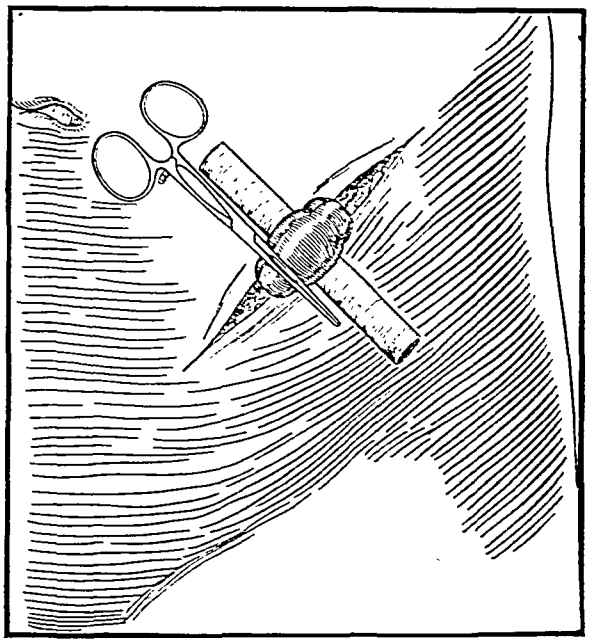


Fig. 9

daily lavage of the rectum. This helps greatly to reduce the amount of inflammation in and around the tumour, and thus lessen the risk of post-operative infection.

Once the problem of complete or partial obstruction has been solved either by cæcostomy, inguinal colostomy, conservative treatment, or a combination of these, depending upon the individual case, the patient can be considered to be in the third group namely—those without obstruction. The problem now resolves itself into a consideration of those surgical methods available for the adequate removal of the malignant lesion.

Operability.—One must first decide whether or not the growth is operable. The figures available on the operability of carcinoma of the rectum and recto-sigmoid vary considerably, ranging from 19.3 per cent in the hands of Boas, to 80 per cent in the hands of Bergman. Miles' estimate of operability is 29.3 per cent. In our series of 89 cases 49 per cent were operable.

There are two main factors that influence the operability of a growth, and the two are inter-dependent: (1) the patient's general condition, and (2) the extent and the nature of the local lesion. Old age, myocardial

disease, hypertension, renal disease, diabetes, and chronic respiratory diseases are serious complicating conditions, and, if advanced, may make the operative risk prohibitive. Whether or not these should be considered contraindications will therefore depend to some extent upon the degree to which they have progressed and whether the carcinoma is early or late, readily accessible or relatively inaccessible. If the growth itself is borderline or advanced the complicating conditions should be considered contraindications to operation.

As far as the local lesion is concerned the most important single factor in deciding its operability is the approximate length of time it has been present. This places a grave responsibility upon the physician who first sees the patient, for only by early accurate diagnosis and immediate treatment can we hope to lower the death rate from carcinoma of the rectum or recto-sigmoid. The extent of the growth and its fixity to surrounding structures are the main indications of its duration. A fixed tumour may or may not be inoperable. If it remains fixed after a colostomy and a period of irrigations sufficient to reduce the perirectal inflammation it is definitely inoperable. A tumour invading the bladder, seminal vesicles, prostate or urethra, is inoperable. A tumour attached to the uterus may, however, be operable if a hysterectomy can be done with the abdomino-perineal excision. The presence of secondary lesions in the glands of the groin or pre-aortic region, makes a tumour inoperable. Deposits on the parietal or visceral peritoneum are contraindications to operation unless closely adjacent to the tumour. Even then, their presence adds greatly to the gravity of the ultimate prognosis. Deposits in the liver may not be a contraindication to operation in a slow-growing tumour, but the operation then has only a palliative value.

Preliminary treatment.—Once the decision has been made that the tumour is operable certain preliminary measures are necessary. Briefly, they are as follows: (1) relief of obstruction, as outlined previously; (2) a highly nourishing pre-operative dietary regimen; (3) control of associated medical conditions; (4) free daily evacuation of the bowel by the use of mineral oil and a sufficient dose of mild laxative, combined with colonic irrigation; (5) diminishing colonic residue and lessening its toxicity by a few days pre-operative low residue non-protein diet; (6) blood transfusion in all enfeebled patients, even if there is only a slight degree of anæmia; (7) peritoneal vaccination. This should be done before the second stage if the two-stage operation is decided upon. We feel vaccination is of definite value in preventing post-operative peritonitis.

Mickulicz first experimented with intraperitoneal vaccination many years ago. More recently Rankin and Bargen[5] have contributed work which places peritoneal immunization on a sound basis. In 1931 they reported two groups of cases in which major colonic and rectal operations were done. In the vaccinated group of 222 cases the post-operative mortality from peritonitis was 4.9 per cent. In the smaller unvaccinated group (58 in number) the mortality from peritonitis was 22.5 per cent. The two groups differ greatly in number, and other factors with reference to risk may not have been strictly comparable. Nevertheless, one must admit that the difference of mortality in the two groups is striking. (See also Goldblatt and Steinberg.[6])

Rankin and Bargen use a specially prepared vaccine containing streptococci and *B. coli*. We have been using triple typhoid vaccine. It is probable that the essential mechanism in the production of immunity is the increase in number of the defensive cells in the peritoneal fluid.

Ninety-six hours before operation a test dose of 25 million typhoid bacilli is given intramuscularly. If no untoward reaction occurs the intra-peritoneal vaccination is done the following morning. A spot in the abdominal wall remote from operative scars is chosen in order to avoid puncturing adherent loops of bowel. The left upper quadrant seems a favourable site as the underlying thick-walled stomach is not likely to be pierced by the needle. The tissues are anæsthetized by novocaine down to the peritoneal layer. A lumbar puncture needle is then pushed through into the peritoneal cavity, the stylus is withdrawn, and a syringe containing 500 to 750 million typhoid bacilli in 10 c.c. of normal saline is fitted to the needle. The vaccine is slowly introduced into the peritoneal cavity. A little

abdominal pain, some nausea, and a pyrexia of 99 to 101° F. for a day or so after the injection are usually the only discomforts the patient experiences. In a recent article Rankin asserts that he has discontinued this pre-operative measure. We feel, however, that the evidence in favour of this procedure is so strong as to justify a continuance of its use. It probably constitutes an additional factor of safety.

SURGICAL TREATMENT

The operative procedures available in carcinoma of the rectum and recto-sigmoid are: (1) abdomino-perineal excision, one-stage or two-stage; (2) perineal excision; (3) electro-coagulation. The first is the operation of choice in the large majority of cases. The second or third is reserved for early carcinomata in the lower third of the rectum or the anal canal, and for cases complicated by old age, myocardial disease, diabetes, cardiovascular and renal disease, or any other factor which makes the risk of the more radical procedure too great.

Various technical modifications of the standard abdomino-perineal operation are described by Miles,[1] Coffey,[7] Jones,[8] Lahey,[9] Rankin,[2] etc., but the essential principle of them all is the same, *viz.*, removal of the entire anus, rectum, ischio-rectal fat, levatores ani, retro-rectal tissues, meso-sigmoid, and the lower sigmoid colon. As can be seen in the section on pathology, nothing short of this will succeed in removing all of the structures that may conceivably be involved in the extension of the growth.

Abdomino-perineal operation. — One should elect the two-stage operation in all obstructed cases and in all cases deemed poor operative risks, for the reasons already outlined. In relatively young individuals with uncomplicated early carcinoma of the rectum proper, who are considered good operative risks, one is justified in using the one-stage procedure (Fig. 5), provided that adequate cleansing of the colon has been attained and that intra-peritoneal vaccination has been carried out.

A paramedian incision is used and the abdomen is explored. The infected tumour should be the last to be palpated. For the colostomy a loop of upper sigmoid is chosen which will come to the skin surface without tension, yet not be loose enough to prolapse. A blunt instrument is pushed through the meso-sigmoid near the bowel, and the opening is extended two or three inches. A two-inch incision is next made through the abdominal wall in the left iliac region and two inches above and medial to the anterior superior spine of the ilium. A crushing forceps is passed through this and its jaws made to grasp the sigmoid at the site chosen for colostomy. A second clamp is applied just below this, through the paramedian incision. The bowel is divided by cautery, and the upper end of the loop is drawn to the surface through the smaller wound. The peritoneum is closed around this. No sutures are placed in the bowel wall as they may cause an annoying fistula at the edge of the colostomy. A small gauze strip is placed alongside the bowel down to the peritoneum and the muscles, and the aponeurosis and skin are drawn together loosely by sutures. The small space left between the upper loop and the left abdominal wall forms a potential opening for small bowel herniation, and therefore should be obliterated by the use of a purse-string suture.

Attention is next directed to the end of the lower loop. Two methods are available. The first is to purse-string and invert the end, and then drop it back into the abdomen (Fig. 6). In the presence of obstruction, even if incomplete, some residue of colonic contents may stagnate in this loop in spite of careful irrigation. Then again, the adhesions that inevitably form between this blind end and the surrounding structures add considerably to the difficulties in locating and freeing it at the second operation. In view of these objections, the second method, advocated by Lahey (Figs. 7 and 8), is probably the more satisfactory. The end, still grasped in the forceps, is brought out through the lower end of the paramedian incision, and the wound closed around it as carefully as that around the colostomy. The forceps can be left on for several days or until the wound is completely healed. The two incisions should be carefully isolated by means of oiled silk fixed to the skin by adhesive. This minimizes the chance of infection spreading from the colostomy to the paramedian incision. A dressing of Compound Tincture of Benzoin under the oiled silk gives still further protection to the wound.

This completes the first stage. An interval of from three to six weeks is usually required between the first and second stages, depending upon the patient's response to treatment. His progress will depend to a great extent upon the thoroughness of his surgical and medical management in the intervening weeks. His fluid balance must be maintained immediately following the operation by the use of glucose and saline solutions by mouth or by the intravenous route. Twenty-four to seventy-two hours after operation the clamp can be removed from the colostomy. We usually insert a rectal tube into the opening and secure it by means of a silk purse-string suture passed around the protruding knob of bowel. This protects against retraction, lessens the risk of contaminating the paramedian incision, and keeps the patient clean. The bowel contents drain off into a bottle, and the tube is kept patent by running in water two or three times a day. As soon as the patient desires food, a low-residue diet is begun, and is gradually increased until he is getting an adequate quantity of nourishing food to build up his general health to the best possible state.

It is of paramount importance to bring about a reduction of the infection around the tumour. To this end repeated irrigations of the lower loop of bowel with normal saline are carried out. If the Lahey procedure is used irrigations can start on the fourth or fifth day. If a blind end has been left in the abdomen it would be wise to wait until the end is well sealed—about a week, before instituting rectal irrigation. Digital rectal examinations are made occasionally to make sure the rectum is being emptied. In ten days the patient is allowed out of bed and encouraged to increase his exercise daily until the time for the second operation arrives. Intraperitoneal vaccination is administered during this interval.

Second-stage operation.—Cyclopropane gas, intra-tracheal ether, or spinal anæsthesia are used. If the Lahey operation has been done the opening in the lower sigmoid must first be sewn over extra-peritoneally and thoroughly sterilized, and the whole operative field again painted with iodine. Gloves, drapes and instruments are changed, and the laparotomy is begun. Adhesions are separated and the sigmoid is exposed. If the blind end has been left in the abdomen this is located and dissected free. Next the inferior mesenteric vessels are identified. An opening is made in the posterior parietal peritoneum, the left ureter is exposed and retracted, and the inferior mesenteric vessels are freed close up to their origin but below the origin of the left colic artery. They are then doubly clamped and divided, and both ends are ligatured. A curved incision is made in the posterior peritoneum on both sides of the meso-sigmoid, extending downwards and forward into the pelvis toward the cervix in the female and the bladder in the male. An inch or more of normal peritoneum should be removed on either side of the tumour. The operator's hand is now passed down behind the meso-sigmoid, stripping the whole mass of fat, bowel and tumour from the hollow of the sacrum and the side wall of the pelvis. As the floor of the pelvis is reached, firm bands of tissue are encountered on either side, containing the middle hæmorrhoidal vessels. These are clamped and divided. Further blunt dissection frees the rectum from the bladder, seminal vesicles and prostate in the male, or from the vagina in the female. The sigmoid and rectum having been thus freed down to the pelvic floor, they are pushed down into the pelvis and the peritoneum is closed over them to form a new pelvic floor. In the female the uterus can be used to help fill in the gap left by the removal of the peritoneum.

The abdominal wound is now closed, and the patient is turned over into the prone position. The table is adjusted so as to flex the hips to an angle of 110 degrees. A silk purse string is made to encircle the anal opening, and is tied securely. An incision is made in the midline, and is extended from the lower sacral region forward to encircle the anus. The coccyx is removed. The posterior fascia is divided and the rectum is pushed forward away from the sacrum. At this point the middle sacral artery is divided and ligatured. Next, the coccygeus and levator ani muscles are hooked with the finger on either side, and divided as near to their origin as possible. As the incision is carried forward through these muscles and through the ischio-rectal fat the terminal branches of the inferior hæmorrhoidal vessels are located, clamped, divided and ligatured. Further blunt dissection frees the rectum from the sacrum and the side walls of the pelvis.

The rectum having been freed posteriorly and laterally, the dissection is now carried out anteriorly, proceeding from the anus upward behind the vagina in the female, or the bulb of the urethra in the male. In the latter, the recto-urethral muscle must be severed.

Following removal of the rectum all bleeding points in the cavity thus formed are ligated and the walls of the cavity lined by oiled silk. Two pieces, six by eight inches, are used, one placed anteriorly, the other posteriorly. Dry gauze is lightly packed between them, and the skin edges are approximated around them by silk-worm sutures. The gauze is withdrawn on the third or fourth day, the oiled silk left in a day or two longer. Thereafter, the cavity is irrigated daily with Dakin's solution, and a small wick is placed between the skin edges to facilitate drainage. Some infection of the large cavity is bound to take place, but it seldom causes any serious trouble.

In the immediate post-operative stage the patient may require blood transfusions or the intravenous administration of gum acacia or saline for shock. The latter may be continued for two or three days as a supplement to the oral intake of food and fluids. If there is difficulty in voiding it is better not to carry out repeated catheterizations in such close proximity to a more or less infected wound. An indwelling catheter is more satisfactory, but should be changed every four or five days. Colonic irrigations and mild laxatives are used as indicated. Medical complications such as atelectasis, bronchial infections, myocardial failure are watched for and treated if they arise. Occasionally the paramedian wound becomes infected. This must be kept in mind if any unexplained rise of temperature occurs or persists. The wound may even appear normal on the surface, yet have some deep-seated sub-aponeurotic infection. A month's hospitalization is usually necessary following the second stage of an abdomino-perineal operation. It usually takes about two months for the posterior wound to heal completely.

Statistics on the mortality rates for this operation vary somewhat. Miles' operative mortality was 9.4 per cent; Jones' 22.7 per cent and Coffey's 15 per cent. In our series of 44 cases (which represent 49 per cent of all the cases of rectal and recto-sigmoid carcinomata seen by us from 1925 to 1936) the operative mortality was 11.3 per cent. This does not include the ten cases treated by electro-coagulation. There were five post-operative deaths. The causes of death were as follows: 1 case—aged 59, myocardial failure after preliminary colostomy; 1 case—intestinal obstruction, herniation of small bowel around the colostomy; 3 cases—general peritonitis (none of these had had pre-operative intra-peritoneal vaccination).

Perineal excision of the rectum.—An essential preliminary to perineal excision is the previous establishment of a permanent colostomy with the upper and lower openings far enough apart to prevent leakage of bowel contents from the upper sigmoid into the blind lower loop which will of necessity be left. A detailed discussion of the operative technique is not required, as it has already been described in connection with the abdomino-perineal operation. The only difference is that the lower loop of sigmoid has to be severed and left. The end of this loop must be carefully turned in so as to avoid an annoying mucous fistula in the perineum.

ELECTRO-COAGULATION OF RECTAL AND RECTO-SIGMOID CARCINOMATA

In a selected group of cases excellent palliative results have been obtained by means of electro-coagulation. Strauss, of Chicago,[10] has reported a series of very satisfactory cases treated by this means, many without colostomy. Ten of our cases have been considered suitable for this method of treatment; only one of them had a preliminary colostomy. The others have been saved a colostomy and are well over periods varying from two and a half years to two months. The earliest of these cases was a debilitated woman with a marked secondary anæmia and an advanced adeno-carcinoma of the cauliflower type which had penetrated the recto-vaginal septum and was fungating into the vagina. This patient is still alive and free from disease.

The indications for this method of treatment are as follows: (1) advanced age (one of our cases is 83 years old); (2) marked general debility from myocardial disease, nephritis, chronic pulmonary sepsis, diabetes, etc.; (3) tumours of the rectal ampulla, especially if situated posteriorly and laterally, *i.e.*, not contiguous to the bladder, prostate or urethra; (4) where colostomy and radical surgery are refused by the patient.

The technique we have used in electro-coagulation is similar to that employed by Strauss *et al.*[10] Under spinal anæsthesia the tumour is exposed through a bakelite proctoscope, and coagulation carried out by means of a circular electrode on an insulated carrier. By this method short-circuiting and cross-sparking are avoided. The smoke produced during coagulation is kept cleared away by suction. The tumour is progressively coagulated until soft tissue is reached, great care being taken to avoid perforation into the peritoneal cavity or adjacent viscera, *i.e.*, the bladder, urethra or ureters. It is generally necessary, especially if the case is at all advanced, to treat the patient in stages, giving two, three or four treatments at intervals of two or three weeks until the tumour has been completely destroyed. In this way the risk of doing undue damage to normal structures is minimized.

Post-operative reactions are minimal, usually consisting of a few days' pyrexia, and an occasional slight hæmorrhage, controllable by medical measures and by packing. One of our cases required a transfusion. We have had no mortality from this procedure, notwithstanding its use in bad-risk patients. If the tumour has been at all extensive a post-operative stricture always occurs. Usually it can be kept dilated, but a local resection, or even a colostomy may be required if the scar tissue is too abundant. Whether its value is more than palliative we are not prepared to state definitely. Strauss reports excellent long-term cures extending from three to eight years, and believes that the electro-coagulation and consequent phagocytic response locally causes in some way a destruction of existing glandular metastases. The possibility of such distant control of metastases has not been demonstrated with other forms of carcinoma treated by electro-coagulation, *i.e.*, of the tongue, etc., and is still open to question.

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SUDDEN DEATH IN INFANCY*

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IN discussing the causes of sudden death in young infants it is still necessary to begin with a discussion of the rôle of the thymus and the condition known as status thymicolymphaticus in these occasional catastrophies. From the time that the thymus was first suggested as a cause there have been endless denials and affirmations. As early as 1845 Friedleben[1] denied the rôle of the thymus in the causation. The controversy, however, has continued up to the present day, and in 1932 Boyd[2] spoke of the "tenacious misconception that respiratory difficulty and disposition to sudden death are associated with status thymicolymphaticus." A special committee of the Medical Research Council and the Pathological Society of Great Britain and Ireland concluded in its report[3] that "the facts elicited afford no evidence that so-called status thymicolymphaticus has any existence as a pathological entity". Paltauf,[4] in 1889 and 1890, first spoke of the "lymphatic constitution". At that time pressure on the trachea from an enlarged thymus was considered the immediate cause of respiratory difficulty and sudden death. Czerny used to demonstrate

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cross sections of a whole infant, taken at various thoracic levels, in order to show how little the thymus lies in relation to the trachea and great vessels and how the bulk of the thymus overlies the pericardium, and thus is through its entire extent almost wholly in relation to the heart (*Fig. 1*). A glance at such a section would convince one that the ordinary thymus could not possibly compress the trachea. Only in rare instances when there are processes going up into the episternal notch does the thymus come into any relationship to the trachea at all. Mitchell and Brown[5] concluded that their study on status thymicolymphaticus furnished no solution to the question of the relationship of sudden death not explicable by some discoverable cause to status thymicolymphaticus. Moreover, a careful study of young infants with respiratory difficulty, whatever the roentgen picture of the thymus will be, will invariably demonstrate the cause of the dyspnœa to be something remote from the thymus. Such conditions as pulmonary atelectasis, micrognathia, nasal obstruction from syphilis or adenoids, and prominent cervical bodies in the throats of mentally defective children have all at some time or other been miscalled "thymic asthma".

With the development of the ideas concerning glands of internal secretion the thymus was then considered such a gland though the nature of its secretion was unknown. As late as 1920 Symmers[6] elaborated what may now be regarded as a fantastic theory. He believed that the most frequent cause of death was in the nature of an anaphylactic reaction due to the sensitization of the body by a specific nucleoprotein formed in the lymph nodes as the result of necrosis of numbers of germinal follicles. Then, too, with the coming of x-rays, it became the fashion to take roentgenograms of infants and make a diagnosis of thymic enlargement. It can truthfully be said that no phase of roentgenology has been subject to a greater divergence of opinion as to what was and what was not a thymus, and as to what was and what was not normal. It was Gerstenberger[7] who demonstrated at the time when belief in thymic shadows and thymic death was at its height, that a "thymic shadow" could be shown either absent or present in the same infant in exposures made within a few seconds of each other, the whole depending upon the phase of respiration during which the exposure was made. Irradiation for enlarged thymus became for a time a fashion until it was observed that where there was respiratory distress the respiratory distress remained unchanged, and that here and there, in spite of irradiation, in spite of alleged cure of the diseased thymus sudden death nevertheless ensued. More recently too, Rowntree *et al.*[8] have been able to show that extirpation of the thymus in rats, while it had no apparent ill effect on the animal itself, had a profound effect on the succeeding generations, causing dwarfism in succeeding litters. On the other hand, administration of thymic extract accelerated growth, development, maturity and fertility. Moreover in a study which he and his collaborators made on a large group of children who had been irradiated for so-called enlarged thymus he found that the percentage of idiots in that group was far larger than in any other group of children, and he asked the question if he were merely irradiating children who were mentally defective or if the irradiation itself produced a more profound effect upon the development of the child than we have hitherto realized? In any event such a question should give us pause before we further proceed with the indiscriminate irradiation of every new-born infant who snuffles, grunts, wheezes, has convulsions or cyanotic attacks. Immediately after Paltauf's work in 1889 Hammar's[9] work appeared. This is or should be well known to anyone interested in the question of the thymus. Briefly, he showed that the size of the thymus was large in any healthy well nourished child and that it was small in any suffering from any acute or chronic illness. He showed that persons killed accidentally had thymus glands as large as persons dying suddenly, and concluded that the thymus glands in children dying after prolonged illness were involuted, and that the normal thymus was the large thymus of the healthy person.

Boyd[2] in an extensive study of the same subject has amply confirmed the original work of Hammar. She says that, whatever the cause of death, "the weight of the thymus decreases with the length of the illness," and that involution begins by the second day of any illness. She concluded that "the concept of a pathological state arose from misconstruing the

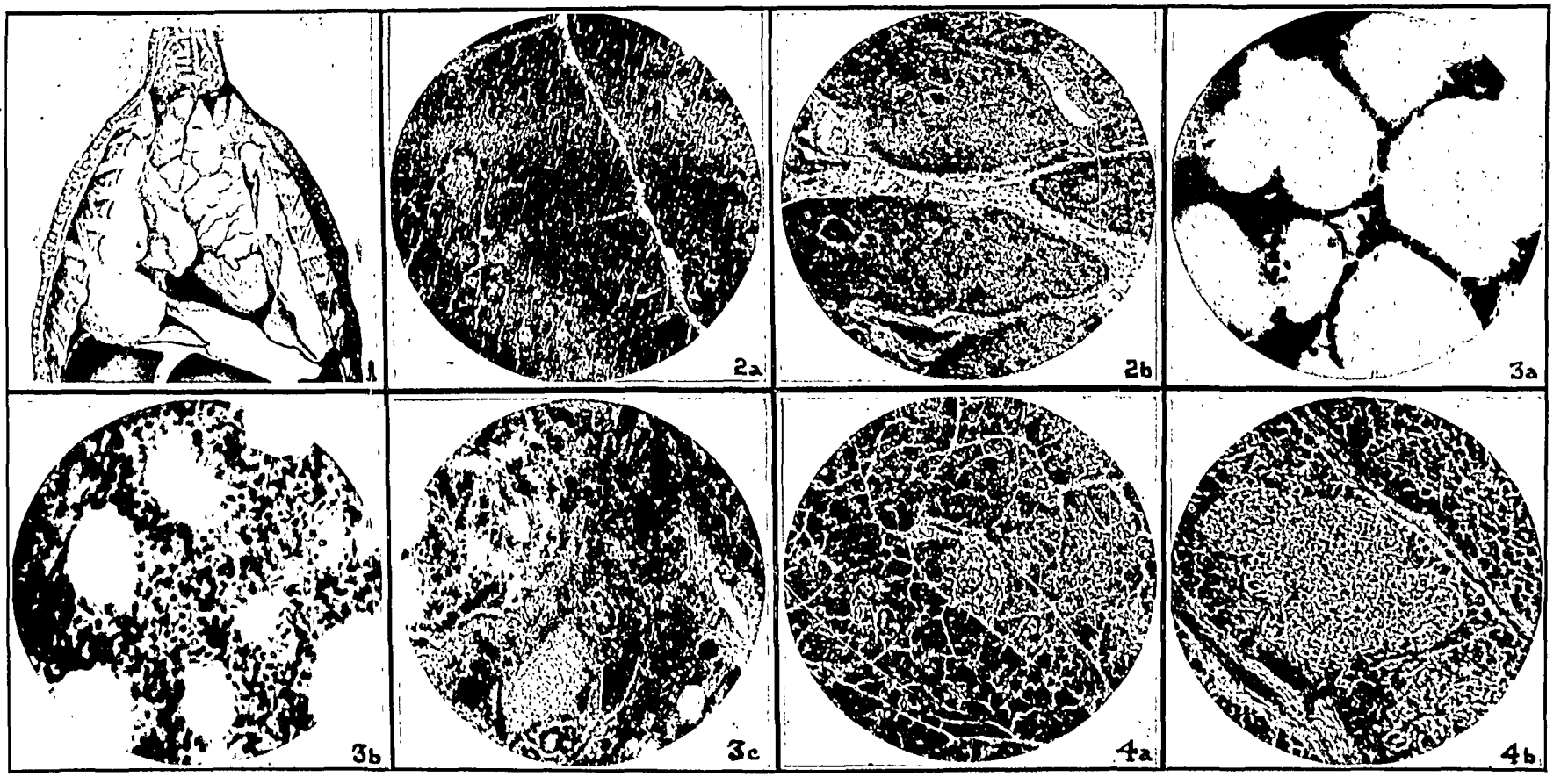


Fig. 1.—Photograph of the normal thymus in the newborn. Note the extent to which it overlies the pericardium. **Fig. 2a.**—Photomicrograph of normal thymus. Note the fine trabeculæ and the width of the cortex (dark due to numerous lymphocytes) as compared to the narrow medulla (pale due to reticulum cells and Hassall's corpuscles). **Fig. 2b.**—Photomicrograph of the atrophic thymus of "accidental involution". This term refers to the atrophy associated with illness or malnutrition as opposed to the natural involution of age. Note the wide trabeculæ and absence of lymphocytes. The parenchyma consists mostly of reticulum cells and hypertrophied Hassall's corpuscles. **Fig. 3a.**—Photomicrograph of normal lung alveoli. **Fig. 3b.**—Photomicrograph of lung alveoli in interstitial pneumonia. The alveoli walls are thickened, congested and contain inflammatory cells. **Fig. 3c.**—Peribronchitis involving a medium sized bronchus. The wall is infiltrated with a moderate number of lymphocytes. **Fig. 4a.**—Photomicrograph of normal island of Langerhans of pancreas. (Pale, round area in centre of picture). **Fig. 4b.**—Photomicrograph of hypertrophied island of Langerhans. (A-36-36).

normal prominent thymus and lymphoid tissue for a constitutional abnormality, and, vice versa, the involuted, inconspicuous thymus of inanition being misconstrued for the normal". (Fig. 2a and Fig. 2b). If this is true, it is evident that no idea of the size of the thymus gland can be obtained unless the patient has died suddenly, for the gland undergoes rapid involution during starvation, infection, or illness of any kind, and what we have been regarding as a pathological entity under the name of status thymicolymphaticus is only an expression of the normal state of the lymphatic system in the well nourished actively growing child. In the matter of the thymus we are faced with this important fact, namely, that in spite of repeated affirmations no proof has ever been brought forward that it is the cause of sudden death in infants. We are faced also with the necessity of revising our meagre knowledge of this subject and of searching more thoroughly for the cause or causes of sudden death in infants. The work of Waldbott[10] and Anthony was a step in that direction. They pointed out that there is a very strong relationship to anaphylactic shock in most cases of so-called thymic death. They showed that a majority of cases which they studied gave a history of one or other manifestations of the allergic state. This is not a new idea because all students of pædiatrics even a generation ago were taught that the infant with eczema was more liable to sudden death than any other child. Waldbott and Anthony's work is a step in the right direction. It is probably not the whole truth. We feel that a more thorough search and more complete post-mortem examinations will reveal not one but a multiplicity of causes of sudden death.

F. Saint Girons,[11] in his report of the Sixth French Pædiatric Conference in 1929, quotes Nobécourt and Boulanger-Pilet[12] as listing the following groups of causes of sudden death in infants. (1) Failure or malfunction of an organ; either circulatory failure, a latent broncho-pneumonia, kidney or digestive tract, meningeal hæmorrhage, retropharyngeal abscess, or endocrinopathy. (2) Acute infection, such as typhoid, atypical diphtheria, scarlet fever, whooping cough or congenital syphilis. (3) Eczema. (4) The thymus which can according to them under certain circumstances cause pressure. (They refer, however, to Apert who denies the possibility of the thymus causing sudden death and because of the rapid changes in the size of the thymus has called it the "accordion organ".) (5) Spasmophilia, with spasm of the glottis and cardiac failure. (6) An unclassified group which has been assembled under the sobriquet "sudden death diathesis".

Our cases at the Children's Memorial Hospital in Montreal fall into two main groups: those suffering a very short though violent illness, and those apparently not ill at all, usually infants found dead in bed.

The following series of cases was selected from the autopsy records of the Children's Memorial Hospital of Montreal, in an attempt to illustrate the foregoing arguments and to make a comparison of thymic weights in cases of sudden death, particularly where a definite factor could be demonstrated. This comprises only 30 cases, as a large number had to be thrown out because of lack of detail, and all deaths associated with anæsthesia have been excluded. A number of the cases used have not been as completely investigated as we would do them at the present time. Nevertheless, they serve to illustrate the point in question.

The standard normal weights which have been used are those of the Status Lymphaticus Committee of the Medical Research Council, as reported by Young and Turnbull.[3] Whenever necessary we have used their methods of calculating the expected weight of the thymus from the age, body-weight, stature, and weight of the heart. Both Bratton and Hammar (quoted by Young and Turnbull[3]) emphasized the importance of considering the relation of the weight of the thymus to that of the body.

The cases have been divided into four groups, each of which will be taken up separately. It is to be noted here that the majority of these patients showed little or no gross changes in the organs.

1. *Obvious infection with death less than 24 hours of onset.*—(Table I).

Six cases were included in this group. In all but one of these (A-35-82) the symptoms and signs developed twelve to twenty-four hours before death. The exception was a well baby who one week before death developed

what was considered to be mild pertussis. On the day of his death he seemed well, had one degree of fever, suddenly developed convulsions, and died in 18 hours. Because of the acute onset of the symptoms and the weight of the thymus it has been placed in this group.

Three infants were under one year of age, in which period the average thymic weight is 26 g., with a standard deviation of 10.9 g. The weights were 24 g., 38 g., and 40 g., respectively. Thus one was normal and two were 1 and 3 g., respectively, above the maximum weight, an excess which is obviously of little significance, particularly as only ordinary precautions were taken for removing extraneous tissue from the thymus before weighing. Three infants were over one year of age. The normal average weight for the thymus in the age-period one to six years is 23.4 g. with a standard deviation of 9.6 g. The weights in these children were 25, 17 and 32 g.—all within the above noted normal range. It will immediately be seen that these weights are greatly in excess of the average autopsy thymus, which usually varies from 3 to 8 g.

Yet from the histological viewpoint definite inflammatory lesions in various organs were present in all cases. Four showed peribronchitis and interstitial or alveolar pneumonia. One case is of interest in this group as it showed the value of extensive histological and routine bacteriological studies at autopsy. This child vomited, became feverish, and was mildly ill for twelve hours. In the next few hours he rapidly became worse and died within twenty-four hours of onset. Gross autopsy (A-35-17) was negative except for a slight hydroperitoneum. Culture of the peritoneal fluid and the heart's blood yielded a pure growth of hæmolytic streptococci. Sections showed an interstitial pneumonia. This child died of a fulminating streptococcal septicæmia and yet his thymus weighed 38 g. As pointed out by Farber,[13] this type of streptococcal infection may show nothing more than a mild peribronchitis and interstitial pneumonia (Fig. 3a, Fig. 3b, and Fig. 3c). The patients die in 18 to 48 hours with a bizarre symptomatology. Another child (A-36-48) in this group of four, died from an acute laryngo-tracheo-bronchitis due to a hæmolytic streptococcus. The infection was so fulminating that death occurred within 20 hours of onset.

The fifth case (A-34-22) had a definite interstitial pneumonia and petechial hæmorrhages in the thymus, pleura and pericardium, but as sections of the trachea and the larger bronchi were not taken, the supporting evidence is absent. One can only say that in view of the clinical history, these lesions suggest infection. The sixth patient (A-34-56) had a history of a fulminating intestinal infection with diarrhœa,

TABLE I.

OBVIOUS INFECTION WITH DEATH WITHIN LESS THAN 24 HOURS OF ONSET

No., age, sex	*Wt. of thymus*	*History*	*Pathological lesions*
A–34–22 10 weeks Male	24 g. Normal 26 ± 11 g.	Irritable several nights. Developed convulsions and died in 12 hours.	Interstitial pneumonia. Petechial hæmorrhages in thymus, pleura and pericardium.
A–34–56 2 years Male	17 g. Normal 23 ± 10 g.	Chills, fever, loose stools, leukopenia. Temperature 104°. Died in 24 hours.	Inflammatory infiltration of colon but no ulcers. Bacteriology negative.
A–36–48 14 months Female	32 g. Normal 23 ± 10 g.	Difficulty in breathing. Temperature 102°. Pus in trachea. Died in 20 hours.	Acute laryngo-tracheo-bronchitis. Early broncho-pneumonia. Organism—hæmolytic streptococcus.
A–35–82 5 months Male	40 g. Normal 26 ± 11 g.	Mild pertussis? one week. Temperature 99°. Suddenly developed convulsions and died in 18 hours.	Marked peribronchitis and interstitial pneumonia.
A–35–17 12 months Male	38 g. Normal 26 ± 11 g.	Vomited. Temperature 100.2°. Twelve hours later temperature 103°. No physical findings. Died in 24 hours.	Interstitial pneumonia. Pure culture hæmolytic streptococcus from heart's blood and peritoneal fluid.
A–35–97 17 months Male	25 g. Normal 23 ± 10 g.	Fever first noted. Developed convulsions and died in 24 hours.	Interstitial and alveolar pneumonia. Right otitis media.

TABLE II.

OBVIOUS INFECTION WITH DEATH WITHIN 1 TO 5 DAYS OF ONSET

No., age, sex	*Wt. of thymus*	*History*	*Pathological lesions*
A–32–37 10 months Female	28 g. Normal 26 ± 11 g.	Convulsions off and on for two days. Temperature 103°. Clinically, tetany. Died suddenly 16 hours after admission.	Markedly hyperplastic parathyroids. Slight interstitial pneumonia and marked congestion of lungs. Died from laryngeal spasm?
A–35–84 10 months Female	21 g. Normal 26 ± 11 g.	Stridor; periodic attacks of cyanosis. Two days before death developed an upper respiratory infection with temperature 105°. Marked evidences of tracheal obstruction before death.	No lung changes. Congenital hæmangioma of the trachea. Early scurvy.
A–37–23 5 months Male	13 g. Normal 26 ± 11 g.	Fever, dyspnœa and constipation two days. Convulsions one day. Temperature 108°.	Interstitial pneumonia. Petechial hæmorrhages in thymus, pleura and mesentery. Scurvy.
A–35–64 2 years Male	13 g. Normal 26 ± 11 g.	Anorexia and pallor since birth. Refused food for 36 hours but did not seem ill. Temperature 102°. Nutritional anæmia. Died suddenly.	Acute appendicitis and peritonitis.
A–35–24 3 months Male	21 g. Normal 26 ± 11 g.	Developed a cold followed by convulsions. Had rickets and tetany. Died while being fed.	Broncho-pneumonia. Larynx and trachea blocked by aspirated milk.
A–34–17 8 months Female	38 g. Normal 26 ± 11 g.	Three days before death, became restless, had difficulty in breathing with stridor. Developed cyanosis and died.	Laryngo-tracheo-bronchitis. Early broncho-pneumonia.
A–36–53 15 months Female	20 g. Normal 23 ± 10 g.	Apparently had a cold for 10 days but did not seem ill; 36 hours before death, developed convulsions. Temperature 102°.	Alveolar and interstitial pneumonia. Peribronchitis. Left mastoiditis. Slight cellular infiltration of meninges.
A–36–36 6 months Male	17 g. Normal 26 ± 11 g.	Pneumonia three weeks previously. Doing well until it died very suddenly during the night.	Healing pneumonia. Pericardial and pleural petechiæ. Remarkable localized hyperplasia of islets of Langerhans.
A–35–12 3 months	17 g. Normal 26 ± 11 g.	Developed a cold. Slight fever which rose to 104°. Negative physical and x-ray of chest.	Marked interstitial pneumonia.

TABLE III.

SUDDEN DEATH WITH ATROPHIC THYMUS

No., age, sex	*Wt. of thymus*	*History*	*Pathological lesions*
A–35–49 6 months Female	7 g. Normal 26 ± 11 g.	Had been in hospital with intestinal intoxication. Discharged well and died suddenly at home 3 weeks later.	Alveolar pneumonia. Left otitis media.
A–36–24 3½ months Male	7.5 g. Normal 26 ± 11 g.	Treated for 10 days for furuncles of scalp. Died suddenly at home.	Atrophy of thymus. Mild tracheobronchitis and interstitial pneumonia with petechial hæmorrhages.
A–36–4 6 weeks Female	5.5 g. Normal 26 ± 11 g.	Pyloric stenosis. Operated successfully. Died suddenly 2 days later.	Patchy interstitial pneumonia with petechial lung hæmorrhages. Marasmic infant.
A–37–2 6 months Male	6 g. Normal 26 ± 11 g.	Upper respiratory infection. Otitis media. Marasmus. Died 15 minutes after feeding.	Obstruction of larynx and trachea by clotted milk. Rickets.
A–33–49 2 months Female	6 g. Normal 26 ± 11 g.	Rammstedt, 3 weeks previously. Ran a slight fever for 3 days before death. Died rapidly with high fever.	Infarction of both adrenals — non-inflammatory. Extra dural hæmorrhages.
A–36–26 1 month Male	5 g. Normal 26 ± 11 g.	Had pneumonia and intestinal intoxication. Died in 6 hours after development of cerebral symptoms.	Pneumonia. Primary thrombosis of all dural sinuses and infarction of brain.

leukopenia, high fever and collapse. Cultures of the large bowel contents were negative for dysentery bacilli, but sections showed early inflammatory lesions of the colon.

2. *Obvious infection with death within one to five days of onset.*—(Table II).

Nine cases are included in this group. All of the children had a definite clinical history of colds, fever and convulsions—in short, symptoms pointing to an infection. The weight of the thymus ranged from 13 to 38 g.—all within the normal limits previously recorded. Seven were under one year of age, and 2 were fifteen months and two years, respectively. Four patients died suddenly or unexpectedly after varying periods of illness, while the other 5 were obviously moribund over a period of hours. The importance of this group is that it illustrates the high thymic weight in relatively short but definite illnesses. Three patients had definite infection on gross autopsy or histological examination, *viz.*, acute appendicitis with peritonitis, peribronchitis and interstitial pneumonia, broncho-pneumonia and laryngo-tracheo-bronchitis. It is noteworthy that the infant (A-34-17) with the largest thymus (38 g.) in this group had a purulent tracheo-bronchitis. Two others had a history of cold and fever for three days and showed a marked interstitial pneumonia. As the thymic weights in both cases were low normals, and the glands microscopically showed evidence of "accidental involution," the patients were considered to have died from an infection. The other cases are of sufficient interest to note individually. One (A-35-24) had broncho-pneumonia, rickets and tetany, but the actual cause of sudden death was asphyxiation from aspiration of milk into the larynx and trachea. A second (A-35-84) had been followed for some months because of stridor due to obstruction in the trachea. The child developed fever with evidence of upper respiratory infection and died. At autopsy a large hæmangio-endothelioma of the trachea was found. It almost completely obstructed the lumen after fixation, and as the lungs and trachea showed no inflammatory lesion it was concluded that a mild naso-pharyngitis had resulted in congestion and swelling of the hæmangioma causing asphyxiation. In the third case (A-36-36) the child had been in the hospital for a month with broncho-pneumonia. He was doing well when he developed an otitis media; thirty-six hours later he was found dead in bed. No gross cause for the sudden death was found, but sections showed a most unusual and marked localized hypertrophy of the islets of Langerhans in the head of the pancreas (Fig. 4a and Fig. 4b). The hypertrophy was much greater than could be accounted for by the pneumonia which was in the healing stage. This finding raises the question of death from hypoglycæmia, but unfortunately this cannot be proved as blood sugar studies were not made. The fourth child (A-32-37) had a history of convulsions, tetany and high fever. The autopsy examination was incomplete, but it showed remarkably hyperplastic parathyroids, confirming the diagnosis of rickets with tetany. It seemed likely that this child died of spasm of the larynx.

3. *Sudden death associated with an atrophic thymus.*—(Table III).

In this group of 6 children the thymus weighed from 5 to 7.5 g. All were under one year of age. Three were in hospital for various conditions, were apparently doing well, and died unexpectedly. The causes were, respectively, obstruction of the larynx and trachea by clotted milk, bilateral venous infarction of the adrenals, and primary thrombosis of the dural sinuses and cerebral veins, with infarction of the brain. The fourth had been in hospital, had been discharged cured, and died suddenly at home three weeks later. Histological studies showed an alveolar pneumonia. The fifth was being treated for furuncles of the scalp and died suddenly. The autopsy showed a tracheo-bronchitis and interstitial pneumonia. The last patient was a marantic infant upon whom a Rammstedt operation had been done. She died suddenly two days after operation, although apparently doing well. No definite cause of death could be found, although lung hæmorrhages and a patchy interstitial pneumonia suggested infection.

This group might better be called that of "unexpected death" as in the majority of cases they were known to have a definite disease process for some time, but the point is that they died just as suddenly as the other types, and yet the thymuses were atrophic. It is uncommon to find a definite anatomical cause for the sudden death, although they show obvious

pathological lesions. Other cases could be added to this group, for in going over our protocols a considerable number of unexpected deaths were noted to have occurred in these cases of prolonged illness. The point is, of course, that one cannot say in any case just exactly why the patient dies.

4. *Sudden death with no previous illness and a normal thymus.*—(Table IV).

The cause of death in this group of 9 cases is more difficult to explain than in the previous groups. Close analysis of the clinical history in eight of them revealed that the apparent previous condition of good health was not so definite as was at first thought. This fact, in conjunction with some of the lesions found, points to the fact that the cause of death had perhaps been operative over a longer period of time than had originally been conceived.

The thymic weights varied from 24 to 50 g. Since in these cases the patients were all under one year of age two thymuses were overweight. Of these latter one (A-34-87) had a very definite cause of death. This infant was well, was fed, put out to sleep, and found dead two hours later. The thymus weighed 45 g. but showed no evidences of having exerted pressure on the neighbouring structures. This child had been asphyxiated by the aspiration of clotted milk.

Four of the other 8 cases showed, as always, negative gross findings at autopsy, but sections revealed tracheitis, peribronchitis and interstitial or broncho-pneumonia. Bacteriological examinations were incomplete, but in 2 the heart's blood was sterile, and in 2 it was not cultured.

Two other cases (A-37-7 and A-36-27) showed changes which we consider to be those of a

TABLE IV.

SUDDEN DEATH WITH NORMAL THYMUS AND APPARENTLY NEGATIVE PREVIOUS HISTORY

No., age, sex	*Wt. of thymus*	*History*	*Pathological lesions*
A-37-7 3½ months Male	50 g. Normal 25 ± 10 g.	Furunculosis for 2 weeks. Temperature 101°. Leukocytes 18,000. Did not seem ill. Found dead.	Interstitial pneumonia. Foci of inflammatory cells in liver. Cellulitis of scalp. Early rickets.
A-37-24 11 months Male	29 g. Normal 26 ± 11 g.	Admitted as a well baby; developed otitis media. Doing well and gaining weight for 2 months. Rise in temperature of 1° for two days. Found dead.	Tracheo-bronchitis and early pneumonia. Left mastoiditis. Heart's blood sterile.
A-34-87 3½ months Male	45 g. Normal 23 ± 10 g.	Well. Found dead in carriage 2 hours after feeding.	Larynx and trachea obstructed by clotted milk.
A-35-86 4 months Male	24 g. Normal 26 ± 11 g.	Being treated for club-feet. Died suddenly, but had had a slight fever for three days. No symptoms.	Interstitial pneumonia with petechial hæmorrhages in lungs and thymus. Soft septic type of spleen.
A-35-87 3½ months Female	27 g. Normal 26 ± 11 g.	Seen 2 weeks previously because of vomiting after meals. Physical examination negative. Died suddenly at home.	Patchy broncho-pneumonia. Bilateral peribronchitis. Petechial hæmorrhages in spleen. Focal inflammation, pons and medulla. Heart's blood sterile.
A-36-27 4½ months Male	28 g. Normal 26 ± 11 g.	Nose bleeds. Vomiting after each bottle. Physical examination negative. Blood count normal. Died suddenly at home.	Interstitial pneumonia with petechial hæmorrhages. Right otitis media. Mild choroiditis.
A-34-110 4 months	39 g. Normal 26 ± 11 g.	Slight cold for day or two. Fed and put to sleep. Found dead 2 hours later.	Marked congestion of lungs with slight infiltration of alveolar walls by polymorphonuclears and possibly an early interstitial pneumonia.
A-36-86 5 months Female	33 g. Normal 26 ± 11 g.	The night before death child seemed well, except that it seemed to breathe noisily. Died suddenly the next afternoon.	Interstitial pneumonia. Mild tracheitis.
A-37-12 2 months Female	25 g. Normal 26 ± 11 g.	Always pale but apparently well. Died at home while being fed.	Interstitial pneumonia. Slight peribronchitis.

fulminating infection, although unfortunately no bacteriological studies were made. In case A-37-7 the thymus weighed 50 g. which is definitely overweight for the average normal. This patient had had a history of furunculosis for two weeks. On admission he had a temperature of 101° F., with a leukocytosis of 18,000. Gross autopsy was negative. Sections showed poorly walled-off furuncles of the scalp, foci of inflammatory cells in the liver, interstitial pneumonia, and early rickets. The clinical history with the leukocytosis, plus the histological findings, point to a fulminating infection. There was no hypoplasia of the aorta or adrenals and no hyperplasia of the lymphoid tissue as is supposed to occur in status thymicolymphaticus.

Patient A-36-27 had a history of epistaxis and vomiting off and on for two weeks before dying suddenly during a convulsion. Physical and blood examinations were negative. Histological studies showed a definite interstitial pneumonia, with intra-alveolar hæmorrhages of the lungs, left otitis media, and a mild choroiditis of the right eye. The thymus was of a normal weight, weighing 28 g., and again there was no hypoplasia of adrenals and aorta or hyperplasia of lymphoid tissue.

The other 2 patients showed indefinite pathological changes, and no lesions of diagnostic importance were present. Patient A-34-110 had had a history of having a slight cold for several days. It was fed, put out to sleep, and found dead. Autopsy showed only marked congestion of the lungs with increased cellularity of the alveolar walls, associated with a few polymorphonuclears and a few isolated streptococci. The findings suggest, but do not substantiate, an infection. The thymus weighed 39 g., only two grams over the maximum weight for this age, so that it cannot be classified as abnormal. Case A-35-86 was a well baby of the Foundling Division who was found dead in bed. Analysis of the temperature chart showed that for three days previously its temperature had been up one degree over the previous month's, although it had had no symptoms. The gross autopsy was negative except for a slightly enlarged soft spleen. Sections showed an interstitial pneumonia and an unusually cellular spleen with scattered hæmorrhages. The thymus, although it weighed 24 g., seemed slightly atrophic as judged by sections.

Six patients in this group showed inflammatory lesions, mainly in the respiratory tract, while 2 had indeterminate lesions and 1 died of asphyxiation.

DISCUSSION

A comparison of the average weight of the thymus in groups 1, 2 and 4 is of interest. The average weight is, respectively, 29.3 g., 20.8 g., and 33.3 g. In spite of the fact that group 4 had two of the largest thymuses in the series, the average weight in this group is only four grams more than in group 1. As can be seen, the weight in the group of definite bacterial infection of less than 24 hours' duration is practically the same as the group in which sudden death occurs in apparently well children. Furthermore, as would be expected, the average weight in group 2 is a good deal lower than in the other two groups because of the longer duration of the disease. As Boyd[2] has shown, death from one day to one week after the onset of an illness results in a moderate reduction of thymic weight.

Group 3 demonstrates that unexpected death may and does frequently occur when the thymus is small and atrophic, both when a child is apparently well and when a definite illness has been present for some time. This agrees with the findings of the Status Lymphaticus Committee, who report a number of such cases.

In none of our cases was there any evidence of hypoplasia of the aorta. As pointed out in the Committee's report "this condition appears to be recognized by general impressions given to the eye and finger or by measurements which have not been correlated to measurements of stature, etc." In other words, no adequate standards for the normal have yet been worked out.

The lymphoid tissue in this series showed no outstanding variation from the normal. The lymph nodes in childhood are extremely variable in any case and, because of this, care must be exercised in judging abnormal enlargement. Here, again, the naked eye is untrustworthy and no accurate normals are known. To estimate this correctly, area or volume estimations would have to be made of different age-groups as in the case of the thymus. The Status Lymphaticus Committee found in a normal series of cases from 0 to 16 years no relationship between the weight of the thymus

and the amount of lymphoid tissue in the various parts of the body in so far as this amount can be indicated by volumetric measurements. Similarly, there appeared to be no concommitant general hyperplasia of lymphoid structures where the thymus was unusually large, although the data collected were small.

Hypoplastic adrenals have always been considered part of status thymicolymphaticus. Experimentally, removal of the suprarenals has resulted in thymic and lymphoid tissue hyperplasia. The hypoplasia is supposed to affect both cortex and medulla, or either one alone. To arrive at an accurate opinion of such hypoplasia accurate measurements of cortex and medulla (as done by Hirning and Farber[14] in mongolism) in a normal and abnormal series are necessary, in addition to the weights of the organ. In this series the weights are all comparable to the normal and none showed any obvious gross or microscopic evidence of hypoplasia.

The cause of death in so-called status thymicolymphaticus has been explained on one of these five theories:[15] (1) death is due to pressure of an enlarged thymus on the trachea, blood vessels and nerve trunks; (2) it is a result of the constitutional defect manifesting itself through an injurious raising of the vagus tone, together with a deficiency of the chromaffin system and weakness of the sympathetic system; (3) it is a result of hypersusceptibility to physical and chemical agents; (4) it occurs through anaphylaxis; (5) it results from an abnormal thymus secretion of a general lymphotoxæmia.

It is generally felt nowadays that death from pressure on the trachea is a rare cause of death and takes a good deal of proving. The allergic theory is promising and interesting, but as yet is only a theory. Waldbott,[10] of Detroit, is a vigorous upholder of the allergic theory, but his pathological evidence is weak and certainly the lesions he describes are non-specific. Hypersusceptibility to physical and chemical agents is of interest particularly from the viewpoint of the effect of cold.[15] Evidence has recently been brought forth that some human beings are sufficiently susceptible that death may result from exposure. The other theories are highly theoretical and will not be discussed. We feel that in a certain percentage of these cases of sudden death a bacterial agent of one type or another is the causative factor. The exact mechanism is obscure and may be due to hypersusceptibility to the infecting organism or to lack of immunity response in the young. The latter has been demonstrated experimentally by Kahn.[16] He found if small doses of virulent streptococci or staphylococci were injected subcutaneously that in adult rabbits furuncles were formed. On the other hand, young ten-day-old rabbits developed no local inflammatory lesions, but instead a generalized septicæmia from which many died in from twenty-four to forty-eight hours. This phenomenon he believes is due to immature functioning of immunity in the young.

We believe that the mild inflammatory changes in various parts of the body in many of our cases are indicative of a fulminating infection either generalized as in A-37-17 or localized to the respiratory tract. It is possible that the same is true of the cases showing the indefinite lesions. It is urged that autopsies in these sudden and unexpected deaths be very complete, with extensive bacteriological investigation and numerous sections particularly of the respiratory tract, including the trachea and large bronchi. Care should be exercised in examining the larynx and trachea to exclude death from asphyxiation due to aspirated milk or other foreign bodies. Further, it is important to inquire into the preceding history, as in the excitement of a sudden death, minor and trifling symptoms are forgotten.

Finally, we do not necessarily believe that all patients such as these die from an acute infection, and we would like to emphasize that in some cases the pathologist has his limitations and that his technique is not sufficiently developed to show changes which perhaps only the biochemist and physiologist can demonstrate. Further, it is our belief that the number of sudden deaths ascribed to status thymicolymphaticus could be reduced greatly by thorough autopsy examinations.

Summary

A series of 30 cases of sudden death in infancy has been analyzed. Nineteen of these at autopsy showed definite inflammatory lesions, indicating, it is believed, a fulminating bacterial infection. Four were asphyxiated from a mechanical cause, 3 from the aspiration of milk, and 1 from a large hæmangioma of the trachea. The remaining case was of theoretical importance, because in addition to a healing pneumonia the child

had a most remarkable localized hypertrophy of the islands of Langerhans.

Five of the remaining 6 patients showed indefinite inflammatory lesions, but taking into consideration the clinical and pathological findings, which were all similar, it is possible that they also died of a fulminating infection. They were characterized by a vague preceding history, sudden death, and at post-mortem by interstitial pneumonia, petechial hæmorrhages in the lungs, thymus and pericardium, and sometimes by a septic type of spleen. The sixth patient probably died of laryngeal spasm associated with tetany. The thymuses, with two exceptions, were not sufficiently enlarged to be abnormal. One of these children died from the aspiration of milk, while the other showed evidence of a generalized infection.

It has been shown that the weight of the thymus in the sudden death group of apparently well children is the same as in the group which died in twenty-four hours from the onset of definite clinical signs of infection. None of the classical features of the status lymphaticus syndrome were present. Further, sudden death has frequently occurred where the thymus was small.

It is suggested that many cases of sudden death, although not all, are caused by fulminating infections possibly associated with immature immunity on the part of the infant. The lesions commonly found are an interstitial pneumonia and a peribronchitis. Lastly, it is urged that post-mortem examinations in cases of sudden death be very thorough, from both the bacteriological and pathological viewpoints, before yielding to the temptation of making the easy diagnosis of status thymicolymphaticus. When no pathological lesion can be found the pathologist must look to the biochemist or endocrinologist for help.

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THE INTERNAL FRONTAL HYPEROSTOSIS SYNDROME

(WITH REPORT OF TWO CASES)

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THIS name has been applied to a condition occurring chiefly, if not entirely, in women about middle age and characterized by peculiar alterations in the skull and by mental and physical disturbances.

Thickening limited to the internal plate of the frontal bone has been known to occur for hundreds of years. Morel[6] reported that Morgagni and Santorini observed internal hyperostosis of the frontal bone in an autopsy on an old woman in 1765. Naito,[2] Casati,[3] and Greig[4] have called attention to the condition. Morel covered the literature up to 1930 and reported a living case. That year a second living case was reported by Van Bogaert,[7] and in 1932 a third case by Schiff and Trelles.[8] In 1928 R. M. Stewart, under the title of "Localized Cranial Hyperostosis in the Insane" reported, on 3 cases that he had followed through to their termination and also reported on several other cases that he had observed. In 1935 and 1936 Sherwood Moore[9] reported 72 cases found amongst 415,944 admissions to a group of hospitals, an incidence of 0.014 per cent. The clinical histories of 59 cases were available for study. His papers[9, 10] adequately discuss the changes in the skull and the associated physical and mental disturbances. Carr[11] reported on 17 cases and discussed their treatment. Schneider[14] and Harbitz expressed their views on the subject, and Henschen[13] reported his findings in a series of 50 cases. Eisen[12] published a detailed report of a living case and briefly reviewed the literature. In addition to these a number of papers dealing with the subject have recently appeared, especially in the foreign literature. Fracassi and Marelli[15] reported 4 cases. Pende[16] reported several cases, and suggested that the syndrome be named "Endocranial Hyperostosis of Morgagni".

Briefly, the characteristic features consist of peculiar mental and physical alterations occurring practically always in women at or about the menopause. Two doubtful cases occurring in men and a case in a woman of 32 were reported by Moore. The changes in the skull consist of a thickening of the internal plate, chiefly of the frontal bone, but may also occur in the other bones. The patients are usually obese or at any rate over the average weight for their age and height. Many of them exhibit metabolic and endocrine changes as shown by a lowered basal metabolic rate and diabetes mellitus and insipidus. The symptoms consist of severe localized or generalized headache, easy fatigability, insomnia, noises in the head, dizziness, crying spells and others, all of which are usually regarded as of psychoneurotic origin.

The following is a report of two cases.

CASE 1

A woman, aged 57, weighing 157 lbs., para-8, was first seen in March, 1937, complaining of parietal headaches for four years following a fright, buzzing noises in both ears for twenty years, discharging ears for two years. The headaches were severe and burning in character requiring constant applications of cold towels. No relief was obtained from medicines. She had felt very weak for several months. Eating much food aggravated the headache. She suffered from constipation and flatulence. There had been no recent change in weight. Menopause was uneventful at 44. The patient had always been very excitable, slept poorly and perspired a great deal. She felt depressed almost constantly but had had no crying spells.

Physical examination.—Bilateral arcus senilis, striæ of both lenses, some blurring of disc margins, moderate sclerosis of the retinal vessels. Hearing was diminished in both ears, especially the left. BC. greater than AC. both ears. The right ear presented a chronic otitis externa and a central perforation of the drum from which oozed serous fluid. The drum of the left ear was scarred and the posterior inferior quadrant was replaced by a thin scar. The nose and throat were not remarkable. The heart was enlarged 2 cm. to the left, second aortic sound accentuated, blood pressure 170/90. Peripheral vessels thickened. E.C.G. showed left axis deviation, P.R. interval 0.2 seconds. Nervous system normal, apart from a tendency to sway to the right when patient stood with feet together and eyes closed.

Blood examination.—Hgb., 80 per cent (10.5 g. Sahli); erythrocytes, 3,250,000; leucocytes, 8,000. Smear slight hypochromic anæmia. Serum calcium, 10.1 mg. per 100 c.c.; serum phosphorus, 2.6 mg. per 100 c.c.; serum phosphatase, 8.3 units (normal 6 to 11 units). Urine was negative. Basal metabolic rate, +18 per cent.

The diagnosis in this case was made by the roentgenologist, Dr. D. Eisen, who was asked to report on the condition of the mastoid antra. In addition to the chronic bilateral mastoiditis he reported:

"There is an early hyperostosis of the internal table of the frontal bone ending sharply at the coronal suture. It does not as yet involve the orbital plate although there appears to be beginning thickening of the posterior wall of the frontal sinus, the lumen of which, however, is not invaded. The hyperostotic bone is laid down in characteristic billows. There is no evidence of any bone absorption. The hyperostosis extends into the diploe but does not in any way involve the external table. On the postero-anterior view the entire frontal bone stands out because of diffuse increase in its density. The roentgen appearance is characteristic of the internal frontal hyperostosis syndrome." X-rays of the long bones revealed a slight thickening of radius, ulna, tibia and fibula along the course of attachment of the interosseous septa and on the lateral side of the upper quarter of the tibia. The entire shaft of the fibula showed slight rarefaction.

CASE 2

Age 52, weight 220 lbs., para-5. First seen in March, 1937, complaining of severe frontal and parietal headaches for 3 years, ringing noises in the ears for 2 years, eczema of ears and ear canals for 2 years. The headaches were very severe in character and were present almost continuously. She wept frequently at the slightest provocation, worried a great deal about trivial matters, slept poorly and felt miserable all the time. Eczema of both ears had been present for some years and had responded but poorly to treatment. Her appetite was fair but she ate sparingly for fear of gaining weight. Menstruation was still occurring fairly regularly. She preferred warm weather to cold weather, her features and skin had not changed, nor had there been any loss of hair. There were occasional aches and pains in the arms and legs of a rheumatic nature and she had moderately enlarged veins in both legs.

Physical examination.—Patient obese, of pituitary type (Fig. 4). Scaling of lid margins, external ear canals full of soggy white material, pinnæ red and scaling. Digestion of scale with potassium hydroxide showed numerous branching mycelia typical of a fungus. Hearing impaired in both ears. Thyroid not palpable, skin normal in texture, hair and features fine. Heart and lungs normal. Blood pressure, 120/80. Abdomen pendulous and obese. Varicose veins in both legs. Reflexes and sensation normal. Patient wept during the examination, memory for remote events poor, attention good, intelligence average.

Blood examination.—Hgb., 80 per cent; erythrocytes, 4,000,000; leucocytes, 6,500; smear slight hypochromic anæmia. Serum calcium, 10 mg. per 100 c.c. Serum phosphorus, 3 mg. per 100 c.c. Serum phosphatase, 7.6 units. The urine was negative. Basal metabolic rate, normal. Fasting blood sugar, 95 mg. per 100 c.c.

In view of the similarity to the previous case a tentative diagnosis of the internal frontal hyperostosis syndrome was made and the patient x-rayed. The report stated "there is no evidence of any increased intracranial tension. There is considerable new bone formation springing from the internal table of the horizontal portion of the frontal bone and extending for about 1.5 cm. posteriorly beyond the coronal suture so as to involve the adjoining part of the parietal bones. The vertical plate of the frontal bone is not apparently affected. This hyperostotic bone shows an average measurement of about 1.5 cm. in thickness. The diploe is not involved. On the postero-anterior view the entire frontal area shows considerably increased thickness." The long bones appeared normal except for slight degree of ossifying periostitis about the medial third of the left fibula.

Both cases were treated with the usual analgesics, sedatives and hypnotics but to no avail. The only drug that in any way ameliorated the severity of the symptoms and allowed the patients a respite was ergotamine tartrate (Gynergen) given orally and hypodermically.

They have continued to take it by mouth and are still obtaining relief with it.

DISCUSSION

This is an interesting syndrome but since its mechanism is not clear it would not be profitable to discuss it at any length. The fact that the patients were clearly benefited by ergotamine tartrate relates the headache to migraine. The fact that most of these patients present the characteristics of psychoneurosis suggests that perhaps ordinary psychoneurosis is an organic condition with as yet an unrecognized structural change in the brain.

There is some question as to its being a definite syndrome. In favour of its existence as a disease entity is our second case which was diagnosed in advance, and also the fact that it exists only in women at or about the menopause. Against the belief that it is a specific disease entity is the fact that we have been mistaken in its tentative diagnosis on a number of occasions.

The earlier papers on the subject related the disturbances to the thickening of the internal plate of the frontal bone and to the adhesions of the dura in that region. However more recent papers have considered the possibility of pituitary and hypothalamic disturbances. Indeed

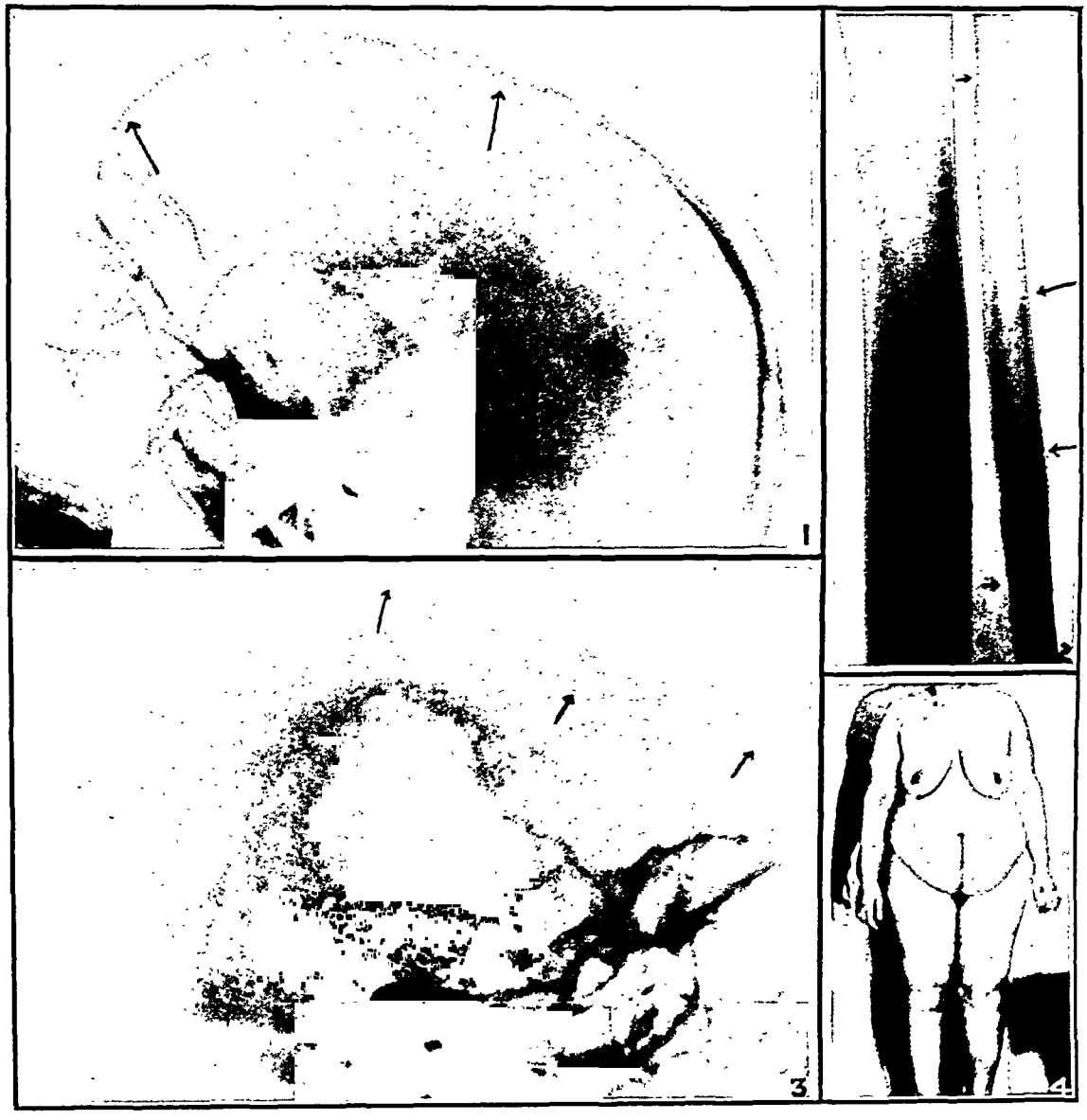


Fig. 1. Case 1.—Early hyperostosis of the internal table of the frontal bone laid down in billows ending sharply at coronal suture. Fig. 2. Case 1.—Slight thickening of left tibia and fibula along interosseous crests. Fig. 3. Case 2.—Hyperostosis of internal table of frontal bone extending posteriorly for 1.5 cm. to involve parietal bones. Fig. 4. Case 2.—Photograph of patient showing nature of obesity.

Pende states that not only was the symptomatology indicative of such disturbances but that the sella turcica showed x-ray changes in all his cases. This latter was not the case in our patients. In reviewing the various theories regarding the etiology and pathogenesis of the syndrome, we feel the most plausible explanation to be a disturbance of the pituitary gland and/or the adjacent structures.

SUMMARY

Two new cases of the internal frontal hyperostosis syndrome have been presented and the following new facts have been adduced.

1. One case was diagnosed in advance of the x-ray findings.

2. The long bones revealed hyperostosis in each case.

3. There was no change in the concentration of the blood phosphatase.

4. The headache was greatly relieved by ergotamine tartrate.

We are indebted to Dr. W. R. Campbell for the phosphatase estimations.

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TERTIARY SYPHILIS OF THE BREAST*

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TERTIARY syphilis of the breast is a rare condition. Even before the introduction of serological tests, and the consequent early diagnosis and treatment of primary syphilis, the condition was rare. It will probably become still less common in the future. It is so unusual that in the Montreal General Hospital, which has been in existence for more than 115 years, we have a record of only one authentic case, and have been able to find fewer than 50 reported in the literature. The majority of these reports have appeared in European publications of the latter part of the nineteenth century. The diagnosis in this pre-Wassermann era was mainly confirmed by the "therapeutic test" of response to treatment with mercury and iodides. Lloyd Thompson[1] of Hot Springs, Arkansas, reporting a case in 1920, gives a comprehensive review of the literature on this subject. He states that the first case on record was described by Sauvages in 1768, although Anstruc in 1736 spoke of "cancer" of the breast occurring frequently in women suffering from syphilis.

As one would expect, tertiary syphilitic lesions, *i.e.*, gummata, are more common in the female than the male breast. The female breast is a definitely functioning organ, whereas the male breast is but a rudimentary vestige. One author, quoted by Thompson, states that "more than three-quarters" of the reported cases have been in women. Actually, we believe, the relative incidence in women is higher than this, as we have been unable to find any detailed description of it occurring in a male patient.

Gummata of the breast are, of course, no different pathologically from gummata occurring elsewhere in the body, and pursue the same course. They first appear clinically as one or more hard painless lumps, and later tend to undergo central softening and necrosis, with the

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formation of sloughing, punched-out ulcers. Two types of lesion are most commonly described, either single or multiple discrete tumours, or a deep-seated infiltration of the breast tissue and adjacent structures, such as in the case which we are reporting. The condition is usually painless, but in some cases pain may be a prominent symptom. Enlargement of the axillary lymph nodes apparently does not occur unless secondary infection enters through ulcerated areas in the skin. In our own case there was no axillary adenitis when the patient was first seen, but after a prolonged period of ulceration the axillary lymph nodes became enlarged and quite hard.

Legrain[2] reports a case similar to our own, with multiple lesions of the breast, scarring, and bronzed pigmentation of the skin. In his opinion these lesions originated outside of the glandular tissue of the breast. There was marked involvement of the axillary lymph nodes, one of which was described as being "as large as a hen's egg". In view of the scarring and pigmentation of the skin in this case it may be assumed that some secondary infection had been present.

It is known that syphilis can imitate almost any pathological condition, and this is particularly true of tertiary syphilis of the breast. It must be differentiated from chancre, abscess, benign tumours, carcinoma, sarcoma, tuberculosis and actinomycosis, according to the course of the disease and the stage in which it is seen.

Paterson[3] reports a case which was operated on for sarcoma. Following operation the wound broke down, subsequently healing under anti-syphilitic treatment. Bissell[4] describes other cases where breasts originally diagnosed as carcinomatous later proved to contain gummata.

It is usually impossible to make a definite diagnosis of this condition from a simple physical examination. The history is very often negative, and it is believed that these tertiary lesions may in some cases be late manifestations of congenital disease. The clinical diagnosis can be confirmed by serological tests; biopsy with microscopic examination of removed tissue, where practicable; bacteriological examination of scrapings from ulcers, when present; injection of this material into guinea pigs; and x-rays of the lungs and chest walls. Finally, the response to anti-syphilitic treatment may be observed.

The treatment of tertiary syphilis of the breast is, of course, the same as that of tertiary syphilis elsewhere in the body.

CASE REPORT

Mrs. A.B., aged 57, first came to our attention on November 14, 1928, when she was referred to the Out-patient Department of the Montreal General Hospital with a diagnosis of "inoperable carcinoma of the breast". The impression of one observer at this time is briefly recorded as follows: "A scirrhous carcinoma of the right breast involving the ribs. There is extensive contraction and cicatrization, with destruction of breast tissue. Very little ulceration. No glands palpable, no pleural involvement."

The patient was first referred to the department of pathology, where a wax moulage was made of the condition for teaching purposes. She was then advised to return for a biopsy and further investigation. She did not return, and was completely lost sight of for three years. On August 20, 1931 she again came under observation, when she was admitted to the surgical ward of the hospital.

Complaints on admission. — Ulceration of both breasts.

History of present illness.—Six years ago the patient met with an accident in which she received a blow on the right breast, a steel of her corset being jabbed into the breast. A lump appeared shortly after this at the site of injury which she treated with poultices. Following this the lump disappeared, but the breast began to ulcerate. This ulceration became more extensive, the lesions refusing to heal. In November, 1926, she was seen at the Montreal General Hospital, but failed to report back for treatment, and the breast continued to ulcerate. About Christmas, 1930, the left breast began to ulcerate. On August 13, 1931, she suffered a severe hæmorrhage from one of the lesions on the right breast, which caused her to seek further treatment. She was admitted on August 20, 1931.

Family history.—Nothing relevant to present illness.

Personal history.—Married. Five children alive and well. One miscarriage; one child stillborn.

Fig. 1

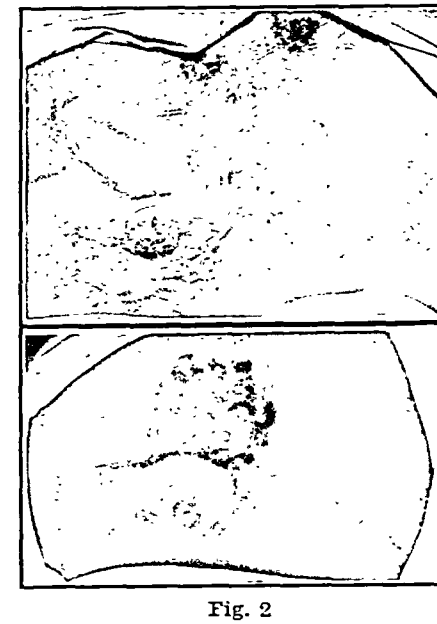


Fig. 2

Fig. 1.—Showing the condition of the breast when first seen in November, 1928. Fig. 2.—Wax moulage of the same breast in August, 1931.

Physical examination.—The right breast was almost gone, except for the nipple and a small amount of breast tissue lateral to it. The destroyed breast was replaced by dense scar tissue, ulcerated in numerous places. The colour of this varied from white cicatricial tissue over the upper sternum to that of a deep reddish or livid hue along the edges of the tumour. There were multiple nodules of varying size over both sides of the chest. On the right side the disease was more extensive, reaching up to the base of the neck. The nodules were quite firm, but not stony hard. Over the left breast, above the nipple, was scar tissue fixed quite firmly to the thoracic cage. The skin was not movable over this area. On palpation the involved area was found to be more extensive than appeared on inspection. Firm nodules could be felt as far out as 2 cm. beneath normal-appearing skin. There was no pain or tenderness, and no sensation was noted on pin-point pressure over the scar. Firm digital pressure, however, was felt. A narrow band of deep red, with a serrated border, could be observed spreading out from the edges of the growth.

Glandular system.—No epitrochlear nodes were palpable; a few nodes palpable in left axilla; none in right. The inguinal nodes palpable.

Eyes.—Pupils round, regular, equal, reacting to light. No pathological eye signs were noted.

Heart.—No enlargement. The sounds slightly muffled at apex; no murmurs heard. The pulse was of low volume and tension, slow and regular. Blood pressure, 120/80.

Lungs.—Anteriorly, examination was made difficult by the local condition. Posteriorly there was impaired resonance in the right apical region and the breath sounds were increased, with both vocal and tactile fremitus accentuated. An occasional râle was audible at the right base, which disappeared on coughing.

Abdomen.—Negative.

Nervous system.—

Reflexes	*Right*	*Left*
Biceps	2 plus	2 plus
Triceps	2 plus	2 plus
Abdominals	0	0
Knee jerks	2 plus	2 plus
Ankle jerks	plus	plus
Plantar	extension	very slight flexion
Gordon	?	0
Chaddock	0	0
Oppenheim	0	0

Urinalysis.—Negative.

Blood Wassermann.—August 21, 1931, 3 plus; August 27, 1931, 3 plus.

On August 24, 1931, a biopsy was performed and a section about 2½ inches by ½ inch removed under local anæsthesia from the lower margin of the involved area of the left breast. Considerable bleeding occurred. The wound was closed with dermol interrupted sutures and a dry dressing applied.

Pathological report.—"The sections consist of skin and subcutaneous tissue. The epidermis is hypertrophied. The capillaries are markedly dilated. The subcutaneous tissue shows considerable scarring. Throughout the whole section is seen a more or less diffuse inflammatory exudate consisting of lymphocytes, plasma cells, large mononuclears and a few eosinophiles and polymorphonuclears. Throughout the tissue there are numerous multinucleated giant cells. Many of these are single, others are in groups and are lying in the inflammatory exudate without any definite tubercle structure about them. In other places they are grouped in small tubercle-like structures; but these do not possess the typical endothelioid reticulum of tuberculosis. In the subcutaneous tissue is a rather large area of necrosis in which the architecture of the tissue can still be discerned. About this area the inflammatory reaction is intense and giant cells are numerous. No actinomyces or blastomyces have been found nor have we been able to demonstrate tubercle bacilli in specially stained sections. There is no evidence of tumour. We feel that this is probably a syphilitic lesion and make a tentative diagnosis of such, and suggest that another piece of tissue be sent for animal inoculation. Spirochæte stains are being run and will be reported on later."

On September 9, 1931, a guinea pig was inoculated with material from one of the ulcers of the right breast. Examined on November 25, 1931, this animal showed no evidence of tuberculosis. Special spirochæte stains failed to demonstrate any organisms.

X-ray of the chest on August 21st, showed the following. "The shadow of the right breast is not seen. There is no evidence of metastases in the parenchyma of the lung. There is a generalized increase in the bronchial and peribronchial thickening and an increase in the root shadows, such as is seen with repeated attacks of bronchitis. There is a calcified area on the right side at the level of the transverse process of the first thoracic vertebra. There is no fluid, no consolidation and no tuberculous infiltration in either lung."

A final diagnosis was made of tertiary syphilis of the right breast with extension to the left breast.

From August 31, 1931, to September 25, 1931, the patient was given an intensive course of antiluetic treatment, consisting of alternating doses of novarsenobenzol intravenously and bismogenol intramuscularly. She was discharged from hospital on September 26, 1931.

The following note was made on discharge:—"There is a definite improvement in the lesions. Some of the sinuses have closed up. The redness about the margins of the affected area is lessened considerably. There is no evidence of further spread. The patient feels better generally."

A "follow-up" on this case since discharge shows the local condition healed. The patient, however, is now developing symptoms of general paresis, with characteristic mental changes, which serves to further confirm the diagnosis of syphilis.

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PUERPERAL SEPSIS*

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IN all medical literature probably no subject is more frequently mentioned than puerperal sepsis. I myself have contributed a good many pages to it so that now it is hard for me to find an approach that will not entail repetition. In accepting your invitation to speak here today I was painfully aware of this and realized that my chief object must be to report on any recent progress made in our understanding of the etiology and of the underlying pathological processes and on improved methods of prevention and treatment.

In the last twenty years there has been considerable progress in all of these directions but that progress has not so far been reflected in any marked diminution in the incidence of or in the death rate from the disease throughout the world. That must mean that the great mass of the medical profession is not yet aware of these advances or, being aware, has not been able to apply them in prophylaxis and treatment.

ETIOLOGY

In the year 1863 Mayerhofer demonstrated microorganisms in the lochia of puerperal women. Six years later Coze and Feltz in Strassbourg found in the blood of a patient with puerperal fever numbers of small objects isolated or arranged in chains. These were also demonstrated by others in the lochia of infected women, but it remained for Pasteur to demonstrate the causal relationship of these organisms to puerperal fever. The year was 1879. Long before this Charles White in England, Semmelweis in Austria, Holmes in America, and Simpson in Scotland had proved the contagiousness of the disease and had laid down rules and regulations for its control. The inauguration of antiseptic surgery through the genius of Lister gave the means of extending that control. Unfortunately, the beneficial effects of Listerism were not nearly so pronounced in obstetrical as they were in surgical practice, and with the advent of aseptic technique the same discrepancy has obtained. This discrepancy is partly due to the fact that the technique of surgeons in general is more thorough than that of obstetricians and midwives in general, but to a much larger degree it is attributable to the fact that the problem of the prevention and treatment of infection is a much harder one in obstetrics than it is in surgery. The field of the surgical operation can be rendered sterile, the vagina of the parturient patient cannot. The puerperal uterus is a much better nidus for the growth of organisms than is the clean-cut surgical wound, and if infection does take place the spread, by lymphatics and blood stream, from the uterus is easier than from any other region of the body. Means of treating puerperal infections are woefully inadequate and unsatisfactory—what the new drug sulfanilamide may be able to do for it will be discussed later—so that our great effort should be directed to prevention.

Sure methods of prevention against any disease must be based upon accurate knowledge of its causation. If it is an organismal disease, that means knowledge of the kind of organisms, their normal habitat, how they are conveyed to the host, how they enter the host, and what defences the host has against them. The fight against diphtheria, typhoid, yellow fever, and malaria has been won because methods of prevention have been so precisely defined and so energetically carried out. This has been possible only because every fact relating to the life history of and reactions to the organisms has been discovered. In recent years we have learned a great deal regarding all these things in puerperal infections, so that, whilst our knowledge is far from complete, we can be much more dogmatic in laying down regulations for prevention than we formerly could. Rules based on general principles and general observations are not so apt to be rigidly observed as those founded upon precise knowledge of cause and effect.

At the present time we think we have facts to substantiate the belief that there are two main

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types of puerperal infection, one caused by a virulent strain of an aerobic hæmolytic streptococcus, and the other by an anaerobic streptococcus. We shall deal mainly with these two types, not forgetting, of course, that there are infections due to other organisms.

Hæmolytic streptococcus infections.—This is the type of infection which was responsible for the epidemics which ravaged maternity hospitals in by-gone years. It is still responsible today for minor epidemics in hospitals and sanatoria, for the occurrence of groups of cases in communities and for sporadic cases. Let us, therefore, consider what facts we have regarding the causative agents, taking up in the first instance the bearing of these facts on the prevention of the disease.

Hæmolytic streptococci are widely distributed organisms. They are characterized by certain morphological appearances and cultural characteristics, and, notably, by their hæmolyzing action in blood agar plates. Organisms coming within this category are, however, not all alike, and in recent years great progress has been made in differentiating them into groups by various cultural, chemical, serological and precipitin tests.

Until a very few years ago every hæmolytic streptococcus was regarded as a certain potential producer of infection. Now, as the result of the pioneer work of Lancefield and of other workers following her, it is possible to differentiate various groups of these organisms and to distinguish sharply between those which are pathogenic and those which are not. Lancefield by her precipitin test differentiated hæmolytic streptococci into several groups—named A, B, C, D, etc. All of these strains may be recovered from the human subject but only those belonging to Group A cause serious infections, the others apparently being mainly saprophytic. This Group A beta-hæmolytic streptococcus is the cause of the various human streptococcal diseases; tonsillitis, acute ear infections, scarlet fever, acute respiratory infections, erysipelas, wound infections, and puerperal sepsis. The same organism may give rise to any one of these, and in transmission from an individual with one disease may cause an infection of a different organ or system in another. Thus puerperal sepsis may be the result of the conveyance of the streptococcus from an individual with tonsillitis and vice versa.

It is with the Group A hæmolytic streptococcus, therefore, that we are concerned in the type of puerperal infection with which we are now dealing. What facts have we regarding it which will help us in preventing its entrance into the genital passages of our parturient and puerperal patients? That is the main problem—to prevent its entry, for, apparently, if it does enter it is practically certain to cause a severe and often fatal infection.

When a hæmolytic streptococcal infection occurs in our practice we can no longer quiet our conscience with the thought that the organisms were already in the vagina or cervix prior to labour. Streptococci are found in these situations in from 1 to 3 per cent of pregnant women: our own investigations in the Sloane Hospital show the latter figure. It was noted that a severe puerperal infection was a great rarity in these women and the explanation was forth-coming, when the organisms were grouped by the Lancefield method, that they practically all belonged to Group B and were therefore non-pathogenic. Those who have worked intensively in this field — Lancefield, Colebrook, Hare, and others—have found the same thing, so that we must conclude that autogenous infection with a hæmolytic streptococcus already present in the genital passages prior to labour is extremely rare. It is possible, however, that Group B organisms may be responsible for some very mild infections.

The most common sites for the Group A hæmolytic streptococcus are the throat and the nose. It is the common organism in cases of acute tonsillitis, sinusitis, mastoid infection, and other upper respiratory diseases. But it may also be present in the nose and in the throat of persons exhibiting no symptoms or signs of infection. These people are merely carriers, but they are as potentially dangerous as those with acute disease. The literature abounds with cases in which it has been proved beyond a doubt—by serological and other tests—that the source of the puerperal infection was a carrier; doctor, nurse, attendant, relative, friend, or the patient herself, who harboured the organism in the nose or throat. One of the first to demonstrate scientifically the importance of the streptococcal carrier was Meleney, who, along with Stevens in 1926, traced the infection of surgical wounds to the presence of streptococci in the noses and throats of the surgeons and their assistants.

When in the year 1927 we had a severe epidemic of puerperal sepsis in the Sloane Hospital for Women in New York, Meleney undertook the bacteriological investigation, and established the fact that the organisms of certain of the infected patients were serologically identical with those recovered from the throats and noses of certain members of the staff. Since then many other workers have established this direct relationship between the streptococcal carrier and the occurrence of puerperal infection in those patients with whom they may have come in contact. Let me quote to you two striking case histories from Smith's series in Aberdeen.

"Cases 53, 55, and 56, were all confined in the same nursing home by different doctors, and all developed puerperal infection. Cases 53 and 55 died, and Case 56 recovered.. In this instance it was shown that two members of a nursing staff of six were carriers of the same type of hæmolytic streptococcus. Removal of all infected cases, closure of the home, and transference of nurses brought the small, but unfortunate, epidemic to an end."

"Cases 59, 60, and 61. The final three cases in the present series can be taken together, as they apparently had a common source of infection. A doctor in a country practice attended two confinement cases, Mrs. L.S. and Mrs. R. on the same day. Both cases had normal labours. Mrs. R. had a rigor two days later, and the first symptom of Mrs. S.'s illness appeared four days later. Five days after these patients were confined, the doctor attended a third patient, Mrs. J.S., who also had a normal labour, and this patient had a rigor on the day following her confinement. The homes of the various patients were situated several miles apart, and the only factor common to all three was the doctor. All three patients rapidly became seriously ill. Mrs. R. was admitted to hospital on the fifth day after confinement, Mrs. L.S. on the sixth, and Mrs. J.S. on the third. On admission all three patients were found to have much fever and rapid pulse-rates, all showed intense signs of uterine infection, with profuse purulent discharge, pelvic and abdominal peritonitis. Mrs. R. and Mrs. L.S. died four days after, and Mrs. J.S. on the day following admission.

"Bacteriological examination showed that all three cases had uterine infections due to hæmolytic streptococci, and from Mrs. R. and Mrs. J.S. the same organism was cultured from the blood. Death in Mrs. L.S.'s case was apparently due finally to pulmonary thrombosis. The patients failed to show hæmolytic streptococci in cultures made from secretions obtained from the nose and throat. The first throat swab taken from the doctor showed only scanty colonies of hæmolytic streptococci, but a second specimen taken several days later showed a profuse growth. These specimens were obtained from the doctor after all his cases had been admitted to hospital.

"Serological examination of the strains showed that all strains obtained from the uteri and blood of the three patients were identical with that obtained from the doctor's throat. Not only so but during her brief illness at home Mrs. J.S. was attended by her sister Mrs. G. and this woman developed a severe tonsillitis on the day following the removal of Mrs. J.S. The tonsillitis was followed by an acute otitis, and from the pus a hæmolytic streptococcus serologically identical with the other strains was also cultured."

Dr. Dora C. Colebrook in her Medical Research Council report on the "Source of Infection in Puerperal Fever Due to Hæmolytic Streptococci 1935" states: "It may . . . be said that the available evidence to date all goes to show that the human respiratory passages constitute the only important stronghold of these strains of hæmolytic streptococci which are capable of initiating severe puerperal infection". She believes that she is understating the case in saying that in 85 per cent of hæmolytic streptococcal puerperal infections the source of the infection can be traced to carriers or persons with infection in the respiratory passages.

Here, then, we have a very definite fact. How can we make use of it in the prevention of puerperal infection? Theoretically and ideally, what we should do is to take cultures from the noses and the throats of every individual—professional and lay—who is likely to come in contact with the patient at the end of pregnancy, in labour, or in the early puerperium, and banish from her presence during these times all those whose cultures show a Group A hæmolytic streptococcus. At the present time that is an impractical measure. It is practical, however, to have cultures taken at regular intervals of doctors, nurses, students, and attendants who are attached to obstetrical services in hospitals and to exclude such as are carriers from attendance on patients until they are free of organisms. We do just that in the Sloane Hospital for Women. Every pupil nurse and every student has a nose and throat culture taken before coming on service and the whole staff is cultured at intervals. These intervals are more frequent in the winter than in the summer months, for it is in the winter and in the early spring months that most positive cultures are obtained. All carriers are excluded. Two negative cultures, at three-day intervals, are necessary before the individual is reinstated on service. Even with such a check-up we cannot be sure that a carrier is not present and, therefore, every one in attendance upon a woman in labour or in the puerperium must have the mouth and the nose properly masked. An efficient mask should consist of at least four thicknesses of gauze or should consist of a layer of cellophane or waxed paper between layers of gauze. It should be sufficiently deep to cover completely both mouth and nose. The nose is most important as the streptococcus is frequently recovered from it when it is absent from the

throat. It shocks one's surgical sensibilities to see a person wearing a mask which barely hides the upper lip. As soon as a mask gets moist it must be discarded for a fresh one and, of course, it must never be reversed. It may seem unnecessary to mention such details, but is it not a fact that masking is often perfunctory? It is only the realization of the great risk we subject our patient to, if we are not properly masked, that will make us scrupulous in its use. That realization we now have. The mask must be worn by every nurse who approaches the patient in labour, by every doctor who examines her—even abdominally—and by every nurse who does a dressing or cares for her in any way during the early puerperium, for I believe that the streptococcus is not infrequently implanted into the vagina in the early puerperium. This is the irreducible minimum of precaution which should be taken by every one in attendance upon the parturient and puerperal woman.

And it must be remembered that the patient herself may have a streptococcus hæmolyticus Group A in her throat or nose. Ideally, therefore, every patient should have a nose and throat culture just prior to labour. Practically this is not possible at the present time. Also it is not practical with the type of mask available to keep our patients masked all through labour. But if she has had a quinsy, head cold or other respiratory infection, or if she has been in contact at home with members of her family suffering from such, cultures should be made. If cultures are positive, she should be masked during labour. We recall a case of fatal streptococcal septicæmia in a patient coming from a home in which two of her children had septic throats. There are other such cases in the literature. If the patient has a positive culture it is important to warn her against putting the fingers near the genitals, to have her hands washed frequently during labour, and to forbid the use of an ordinary handkerchief, for it is generally conceded that if uterine infection does occur as the result of the presence of streptococci in the respiratory passages of the patient herself the organisms reach the genital passages by contact and not by the blood stream.

Let me sum up this aspect of the subject by stating categorically that I believe that the main cause of hæmolytic streptococcal puerperal infection is the spraying of the organisms from the nose and throat on hands, gloves, instruments, utensils, and dressings which come in contact with the patient, and that the only effective safeguard we have at present is complete masking.

We used to believe that streptococci had a very short life outside the host. In the Sloane Hospital epidemic in 1927 we exposed culture plates in the rooms of infected patients and took cultures from floors, walls, and bedding, and never recovered the organisms. We, therefore, concluded that the organisms did not survive for long. Last year Dr. Elizabeth White, working with Dr. Colebrook in Queen Charlotte's Hospital, London, published a most important paper (*Lancet,* April 25, 1936) in which she states that the hæmolytic streptococcus can be recovered from the dust of rooms occupied by infected persons and that the organisms may survive for a considerable length of time. The difference between Dr. White's technique and ours was that whilst the plates were exposed in Dr. White's experiment the rooms were swept and that the first incubation of the plates was done anaerobically. With this technique she was able to culture on the plates so exposed streptococci serologically identical with those of the patient. Furthermore, in one instance the person who swept the room developed an acute pharyngitis due to a streptococcus serologically identical with that recovered from the dust and from the patient. Here, then, is scientific proof of what we have long known to be true, namely, that it is dangerous to put a clean case into a room or in an environment recently occupied by an infected patient. Charles White of Manchester, England, in his treatise on "The Management of Pregnant and Lying-In Women", published in 1773, discussing childbed fever emphasized the need of ventilation, clean rooms, clean linen, the isolation of patients in separate rooms in hospitals and the immediate removal of patients with the disease from those unaffected. After a patient with fever left the room all bedding and curtains were to be washed and the floor and woodwork cleansed with vinegar. That was written nearly one hundred and fifty years ago, and we still find today women being confined under conditions very little different from those against which White inveighed.

With the increasing use of analgesia and anæsthesia, and with the increase in operative delivery, more and more patients are being

delivered in hospitals and fewer and fewer in their own homes. This I believe is all to the good provided the hospitals are properly planned and efficiently conducted. If they are not they may be the most dangerous places possible in which to put a parturient or puerperal woman. The small hospital or sanatorium which admits all sorts of cases, medical, surgical, obstetrical with no special section for the latter, with no delivery room apart from the surgical operating room, with no isolation unit, with no one in absolute authority to lay down rules and regulations, is a menace in a community so far as obstetrical patients are concerned. It may go along for years without disaster but disaster may occur at any time. It is far safer to deliver a patient at home than in such a place.

An obstetrical hospital should be a separate building or, if part of a general hospital, should be structurally separated from the rest, with a separate nursing and housekeeping staff. The delivery rooms should be for deliveries only. There should be available rooms in which infected patients can be isolated and these should be serviced in such a way that there is no mixing of nursing utensils, bedding, or food with those used by well patients. Rooms occupied by infected patients must not be used by others without thorough disinfection.

All this was said one hundred and fifty years ago, simply as the result of conjecture. Today we have the underlying scientific facts and yet we are remiss in their application. Most of us detest fussiness, and cannot bring ourselves to carry out small details of which we do not see the immediate need. But this question of the planning and running of an obstetrical hospital or of an obstetrical unit in a general hospital is a very practical problem and one that can be solved very easily by the application of common sense to the scientific facts at our disposal.

Let us now turn to the second of the two important varieties of infection which we mentioned at the beginning, namely, that due to anaerobic streptococci. As long ago as 1893 Veillon described an organism which he designated the *micrococcus fœtidus,* and in 1895 Kroenig demonstrated in the vagina of pregnant women and in the lochia of patients with puerperal fever an anaerobic streptococcus. Later, in 1910, Schottmuller described an anaerobic organism which he called the *streptococcus putridus,* which caused an infection characterized by extreme putrescence of the lochia. Later work has shown that there are other varieties of these anaerobic organisms, some of which in their growth in devitalized tissue produce foul gases and some of which do not. Some have the morphological characteristics of the aerobic streptococcus, and some occur singly and not in chains, some are smaller in size, but all are characterized by the fact that they do not grow in the presence of oxygen. Most of them are non-hæmolytic but some are hæmolytic.

These organisms exist as saprophytes in the vagina and under ordinary circumstances are non-pathogenic or are possessed of a very low pathogenicity. Under certain conditions however they acquire virulence and may cause mild infections characterized by profuse fetid lochia, a low-grade fever lasting a few days, and a soft, tender subinvoluted uterus; or they may cause a more serious infection with thrombo-phlebitis of the pelvic veins and a remittent fever lasting over a considerable time; or again they may grow in the blood stream, producing a true septicæmia. In former years we were often puzzled by the fact that in some obvious clinical cases of fatal puerperal septicæmia we could not culture organisms from the blood. The reason was that the cultures were made only aerobically. Now, it should be a routine to make all cultures both aerobically and anaerobically. We shall then find that the infecting organism is an anaerobic streptococcus in some instances, more especially in cases of septic abortion.

What means have we at our disposal to minimize the risk of infection by these organisms? As they are saprophytic in the vagina the answer would seem to be; kill them there before the onset or during the course of the labour. Various attempts have been made to do this by the application of a great variety of vaginal antiseptics introduced as douches or as topical applications. One of the longest and most impressive investigations along these lines has been conducted in the Long Island College Hospital in Brooklyn by Mays and his colleagues. After the routine was established of instilling a solution of mercurochrome into the vagina of every patient in labour, the deaths from sepsis were reduced from 17 to 9 per 5,000 and the morbidity was correspondingly diminished. Whether this reduction was mainly due to the technique adopted or not is a matter for debate. Mercurochrome is after all a very weak antiseptic.

Colebrook carried out experiments on five women, using mercurochrome and other antiseptics, checking the bacterial content of the vagina before, during, and after the treatment.

"These five records show that the genital tract was not sterilized in any instance, following the repeated application of mercurochrome, crystal violet and brilliant green, or dettol. In two cases there were approximately as many organisms grown three hours after the first treatment as before. In all probability this failure is attributable to multiplication of the bacteria somewhere, perhaps in the glands of the cervical canal, out of reach of the antiseptic.

"The outstanding feature of the results is that in four of the five cases the bacterial species originally present, species believed to be of little or no pathogenicity, were replaced or joined by other species of definitely greater pathogenicity, *e.g., B. coli, B. proteus,* hæmolytic staphylococcus, and fæcal streptococcus. It would seem probable that the introduction of the chemical agent had so altered the mucosal cells or their secretions as to permit these species, which are not normally present, to establish themselves.

"Although the number of cases is admittedly small this investigation suggests the tentative conclusion that it is inadvisable to attempt to improve upon Nature's arrangements for keeping the genital tract free from pathogenic bacteria."

With this conclusion I am in accord and believe that we must rely on other measures to minimize the risk of this autogenous type of infection of which we are now speaking. These measures are directed towards the avoidance of every procedure which will result in contusions and lacerations with devitalization of tissue, for it is in such tissues that these organisms grow and may acquire virulence. It is the long exhausting labour with much operative manipulation which predisposes to this type of infection.

It has been stated that the forceps operation is responsible for many cases of sepsis. This is undoubtedly true, but the statement requires modification, for other factors have to be taken into consideration. In a consecutive series of 500 forceps deliveries, and in a similar series of spontaneous deliveries in the Sloane Hospital for Women, we found that the morbidity rate of the former was 11.6 per cent, and of the latter 8 per cent. On analyzing the cases further it was shown that the average length of labour was ten hours more, and the interval between rupture of the membranes and delivery eight hours more in the forceps than in the spontaneous cases. Lacerations of the pelvic floor or vagina occurred in 89 per cent of the forceps, and in 50 per cent of the normal cases. We are inclined to think that the two factors of prolonged labour and of trauma are more important than the actual operative procedure. Those two factors are most frequently present in the high and medium forceps deliveries. The low forceps operation, if aseptically and skilfully performed, does not add to the risk of the mother, but any operation other than this does. High and mid-forceps operations should, therefore, be reserved for cases absolutely demanding them and should not be used "prophylactically". When once the necessity for a forceps delivery is evident, and conditions are such that it can be performed, every hour of delay adds to the risk. As a further proof that instrumentation in itself is not responsible for a high incidence of sepsis I quote the morbidity rates in private and in ward patients in the Sloane Hospital. In the former the morbidity rate was 8 per cent with a forceps incidence of 45 per cent. In the latter, *i.e.,* ward patients, the morbidity rate was 17 per cent, and the forceps incidence only 19 per cent. In comparing these two classes of patients other factors must, of course, be taken into account, but the figures are striking and must make us doubt that judicious minor operative interference *per se* is an important factor in puerperal morbidity.

Deep anæsthesia which prolongs labour and increases blood loss post-partum is, on the other hand, a predisposing factor in puerperal infection, as borne out by our Sloane records.

Prophylaxis against this type of infection boils down to the proper management of pregnancy and labour. Proper pre-natal care will bring the patient to labour in the best possible physical condition. Pre-natal examinations will enable us to form a prognosis as to the probable course of labour and to plan for the type of delivery. The conservation of the patient's strength by light nourishment and above all the maintenance of body fluid in long labours are most important. When operative procedures such as forceps or version are definitely indicated they should be done as soon as conditions are optimum. A timely episiotomy is less hazardous than an irregular contused laceration. Naturally the skilful operator who handles instruments and tissues gently will get better results than one who is less skilled. We can never get away from this personal factor. The skilled obstetrician is he who knows when to let Nature take her course and when to interfere. In interfering he does so at the proper time and with the greatest gentleness and manipulative skill. He conserves his patient's strength and guards her against excessive loss of blood. Such a one will have few cases of anaerobic streptococcal infection.

What I have said regarding the prevention of these two main types of infection all sounds absolutely commonplace, and I have used up practically all of my time in expounding what you may regard as the obvious. But I offer no apology, for prevention is the crux of the problem and all of us have hitherto failed in greater or in lesser measure in making it effective.

Little time remains for a discussion of treatment when infection is definitely present. We are all thrilled by the results so far reported from the new drug sulfanilamide. This is the non-proprietory name officially adopted by the Council on Pharmacy and Chemistry of the American Medical Association for the chemical substance para-amino-benzene-sulfanamide. The drug as first used in Europe was a red dye, prontosil. The active part of this so far as antibacterial action is concerned is sulfanilamide. This part contains none of the dye. One firm markets it under the name prontylin and other firms under various other designations. It would seem best to use the one name, sulfanilamide. This drug can be administered either by mouth in the form of tablets or in solution intravenously. The former is the method recommended, the latter only being used in cases where oral administration is impossible on account of nausea or in cases in which a large initial dose would seem to be indicated. When administered by mouth the quantity given should be from 3 to 5 grams each twenty-four hours in divided doses.

Let me say at the outset that I have had no personal experience in its use in puerperal infection, for it so happens that we have not had a single case of infection with a Group A beta-hæmolytic streptococcus since the drug came upon the market. We do not flatter ourselves that this is due entirely to the precautions we take against its entry into our patients; other factors probably play a large part, the most important of which may be the epidemiological one. There is evidence that the prevalence of streptococcal infections in general and the virulence of the organisms vary from year to year in very much the same way as with influenza. It would appear that this is not a "streptococcal year" in New York for I learn from my colleagues in other hospitals that their incidence of infections is also low. We have not used it in other types of infection, for the many studies that are being made throughout the world indicate that it is against hæmolytic streptococcus alone that sulfanilamide is effective. In the study going on in the Presbyterian Hospital of New York, with which the Sloane Hospital is associated, this is borne out. There may be an exception in the case of some meningococcal and gonococcal infections, but on the non-hæmolytic streptococcus and the anaerobic streptococcus it seems to have no effect. In the coming year we shall doubtless learn much more about the drug. Meantime a word of caution is in order. Sulfanilamide is not without toxic action and should not be given indiscriminately in every case of puerperal infection. The indication should be the recovery of the Group A streptococcus from the cervix or the blood. Until bacteriological diagnosis can be definitely established it may be given to cases which clinically appear to be infections of this type, but should be discontinued if they prove otherwise.

We have no specific for the treatment of anaerobic infections and must rely on general measures, especially on blood transfusions to sustain the strength and increase the resistance of the patient. I mentioned that it is especially in cases of incomplete septic abortion that the anaerobic streptococcus is found. There is increasing clinical evidence that the removal of necrotic débris from the uterus of such cases, provided it is done with the utmost gentleness, shortens the disease and expedites convalescence. When the infecting organism is the aerobic hæmolytic streptococcus, I believe that what has been taught for many years is still true, *viz.*: that any intrauterine manipulation is attended with a grave risk of causing generalized lymphatic or blood spread. So, even if we may now have a drug which is almost a specific against one type of puerperal infection, the old truth holds "Prevention is better than cure".

ACUTE INTESTINAL OBSTRUCTION—APPENDICEAL

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Ottawa

THIS title might be acute obstruction of the appendix or acute appendiceal obstruction. The condition has been named by Wilkie "acute appendicular obstruction". It is my endeavour to get away from the term "appendicitis", so that there will be no confusion between this condition and acute primary (inflammatory) appendicitis or true appendicitis. Let us keep in mind that the suffix "itis"—means inflammation. It seems ridiculous to apply the same term to two absolutely different pathological conditions simply because they occur in the same organ. One would not think of calling diphtheritic infection of the tonsils, tonsillitis. Obstruction of the appendix in its acute form is just as dangerous comparatively as diphtheria is in relation to ordinary inflammatory tonsillitis. In a recent article by Priestley and McCormack[3] entitled "General peritonitis secondary to rupture of the appendix" they say, "Clinically and pathologically the significance of Wilkie's differentiation of the two important types of appendicitis has probably not been sufficiently appreciated. Wilkie emphasizes the distinction between 'acute appendicitis' and 'acute appendicular obstruction'. The former condition is primarily an inflammation of the wall of the appendix without initial obstruction of the lumen. This type of appendicitis is usually gradual in onset, less rapid in its course, and less likely to progress to gangrene and rupture than is the obstructive type." (The obstructive type is not appendicitis.) They go on to enlarge upon obstruction of the appendix, and then say that in any discussion of appendicitis an accurate definition of terms and grouping of cases is essential. They append one reference to an article by Wilkie in their long bibliography. In their classification and grouping there is no mention whatever of "acute appendicular obstruction" or acute intestinal obstruction—appendicular. All of which confirms the suggestion which they make themselves that Wilkie's work has "not been sufficiently appreciated". I wrote to Priestley along this line and in his reply he says: "I realize from your letter we did not stress the differential signs and symptoms of these two types of conditions adequately".

Wondering how widely the point in question was appreciated and taught, I wrote the following letter to the surgical department of nine medical schools: "I am interested in the extent of the application of Sir David Wilkie's teaching, which differentiates between primary inflammation of the appendix and primary obstruction of the appendix. It will be appreciated if you would return to me answers to two questions: (1) Does your school of medicine teach Wilkie's differentiation in appendicular disease? (2) Is such teaching emphasized as being important and life-saving?" These schools were equally divided between Canada, the United States and Great Britain. Those in the United States were, one on the Atlantic coast, one in the central region and one on the Pacific coast. In Great Britain, one in London, one in the provinces and one in Scotland. Replies by return mail were received from all except one of the Canadian schools. As most of these were of a personal nature and no good can arise from quoting names and places such details will be omitted. The replies were as follows.

CANADA

1. Both questions in the negative, with this note. "I find it impossible to be certain of the condition by clinical signs. Importance to life must depend on perforation and peritonitis after it."

2. "I am afraid I cannot give an adequate answer to your questions in regard to appendicitis without writing a paper. However, my answer to the first question is: (*a*) Does you school of medicine teach Wilkie's differentiation in appendicular disease? *No.* (*b*) Is such teaching emphasized as being important and life-saving? *No.* We agree with Wilkie that a perforation which is frequently the result of an obstruction is very serious because it bursts into an open peritoneal cavity.

UNITED STATES

1. East. Question No. 1: yes. Question No. 2: important, yes. Life-saving, no.

2. Central. "We do appreciate and teach Dr. Wilkie's differentiation between primary inflammation and primary obstruction of the appendix. We perhaps do not lay as much stress on the distinction as he does simply because of our belief that every patient in whom a diagnosis of appendicitis can be made should be operated upon at the earliest possible moment. We would not *willingly* temporize in any case."

3. West. "No great effort is made here to distinguish between primary inflammation of the appendix and primary obstruction of the appendix. We feel

that either condition should be considered as an acute surgical condition and the *earliest possible removal of* the appendix advised. *We have naturally observed that those patients having a large single fecolith are much more apt to perforate the appendix early than the kind which has diffuse inflammation throughout the appendix itself.*"

GREAT BRITAIN

1. London. "We are quite certain of the difference of the two varieties and have had specimens illustrating acute obstruction of the appendix and have taught the different clinical divisions long, long before Wilkie made his great discovery, and we have always laid stress on the fact that *those with the symptoms of obstruction must be operated upon at once.*" (This is particularly interesting as a prominent graduate of this school most definitely does not subscribe to this teaching.)

2. English provinces. "I can tell you that both answers, in *my* teaching, are *yes*. In this school, however, we must have at least twenty surgeons and whether they would all subscribe to that answer I do not know."

3. Scotland. "It is quite impossible, in my view,—nor, indeed, is it desirable,—to give simple affirmative or negative answers to either of the two questions which you put to me. As regards the first question I have to say that, while we recognize here the value of Wilkie's work in connection with the differentiation of cases of appendicitis, we do not agree that any hard and fast line can be laid down as between non-obstructive and primarily obstructive appendix lesions. As in so many other conditions, so also here, there are wide variations, which are recognizable histologically and often clinically. Unfortunately, the two do not always coincide.

"As regards the second question, we still find the difficulties that others find in differentiating clinically between certain types of appendicitis; and while in many cases we feel that we can, with a certain degree of assurance, differentiate between urgent and non-urgent cases, we still encounter the occasional case in which the clinical evidences appear much less decisively urgent than one would have expected from the operative findings. *We do, however, recognize that the obstructive appendix lesion is the one to be feared beyond most, if not all, others.*"

We therefore have the score for and against as follows.

	For	*Against*
Canada	..	2 (no answer from one)
United States ...	2	1
Great Britain ...	3	0

I have asked graduates of the missing Canadian school if they were instructed on this point. The answer was in the negative. We can list all three Canadian schools in the "against" column on the information available.

Holder and Wells[2] in a recent article entitled "Survey of appendicitis in San Diego" ignore "obstruction of the appendix". They endeavour to explain massive gangrene in atypical cases on a circulatory basis. I have checked the majority of the references given in their article and several other such articles appearing in the recent literature and have failed to find, either in the body of the script, or in the references given any mention of Wilkie or obstruction of the appendix. Many of the authors of these papers are either graduates of or on the staff of the medical schools canvassed in the above survey. It would therefore appear evident that by and large acute obstruction of the appendix, as an entity, is being ignored in Canada and the *United States at least and Wilkie's remarkable* contribution is not bearing the fruit it deserves.

There is a general admission that the mortality from "acute appendicitis" is not decreasing. I feel that one is perfectly sound in saying that it is on the increase. The mortality figures seem to have been analyzed from almost every conceivable angle, such as age, sex, time and type of operation, incision, anæsthetic, administration of cathartics (even the kind of drug administered), relation to intake of food, to the rising and the setting of the sun, the season of the year and so forth, but no one except Wilkie seems to have given any great thought to what, to me, appears the true crux of the situation.

The last word, as it were, as given in an editorial by F. Gregory Connell[1] is. "After these exclusions — of chronic, acute, non-perforated and perforated with abscess—there remains the type of appendicitis in which the mortality rate is high (24 to 40 per cent) and the treatment of which calls loudly for improvement." I am firmly of the opinion that this highly mortal type is "intestinal obstruction—appendiceal" or, as Wilkie termed it, "acute appendicular obstruction". Connell also says in the same editorial:—"To enhance the value of 'statistics' and to simplify the study of mortality rates, it might be advisable to subdivide the subject of appendicitis as follows.

Appendicitis { non-operative treatment
operative treatment { chronic
acute { non-perforated
perforated { abscess
peritonitis { local
diffuse."

Again we see no suggestion of the gravest form of appendicular disease—acute obstruction.

To segregate the obstructive lesions the following subdivision is suggested.

- Acute appendicular disease
  - primary inflammatory
    - non-purulent
    - purulent
      - abscess formations
      - general peritonitis
  - primary obstructive
    - localized by early operation
    - generalized by rupture
      - treated by immediate operation
      - treated expectantly

It must be understood that acute obstruction may be superimposed upon acute inflammation. When this occurs the character of the pain changes, becomes more severe and cramp-like. Not only does the character of the pain change, but also, and emphatically, the character of the attitude of the attendant must change to one of urgent speed in removing the obstructed organ.

Infected thrombosis of the veins draining the cæcal region, *i.e.*, the superior mesenteric vein, throws an entirely different consideration into the picture, and it would be well to segregate these cases independent of whether their origin be in obstruction or inflammation of the appendix. Multiple chills, either pre- or post-operative, are the warning in this condition, and the treatment is ligature of the infected vein above the limit of thrombosis. The portal pyæmia, which produces the chills, is thus controlled.

Wilkie[4] says in his original article on this subject, "If we set out by recognizing two definite types of acute disease of the appendix—namely acute inflammation and acute obstruction—then not only does the understanding and the teaching of symptomatology of acute appendicular disease become much more simplified, but the early diagnosis of such disease becomes invariably more confident and more correct".

What are the differences between these two conditions? Acute inflammation is the same here as in any other location. It arrives as the legitimate heir to the throne accompanied by heralds and trumpets; elevation of pulse and temperature from the beginning. The patient is acutely ill, as with any inflammatory disease. The pain is not acute nor cramp-like. But not so with obstruction; it is as the usurper approaching stealthfully, makes no commotion, there is no elevation of pulse and temperature, no leucocytosis, no turmoil, until the damage is done. A snake in the grass that strikes quickly and venomously. The pain is acute and cramp-like.

One can say that in acute inflammatory appendicitis there is practically no danger to life, and that operation *may* be done safely and sensibly at any time, late or early. This is because the inflamed organ becomes thoroughly walled off by the protective processes going on within the abdominal cavity, and at worst a localized abscess occurs. (It is understood delay is not counselled.) Not so in acute appendicular obstruction. It is not an inflammatory process; the protective mechanism of the abdominal cavity is not warned and so does not bring its forces into action. The result is that when the appendix bursts the contained infection is spread broadcast in the peritoneal cavity. There is only one time at which to operate, and that is before the symptoms of "appendicitis" appear, that is before inflammation occurs.

The sequence of events in acute obstruction of the appendix is as follows:—the lumen of the organ becomes shut off from the lumen of the bowel. According to the amount of bacteria and fermentative material contained in the appendix, distal to the obstruction, there will be varying degrees and speed of fermentation and distension of this portion. There is peristaltic effort on the part of the appendix to expel the contents, and pain typical of an obstructive intestinal lesion occurs, *i.e.*, cramps accompanied by reflex irritation of the rest of the gastro-intestinal tract, evidenced by nausea, vomiting and movement of the bowel, either singly or in association.

The most common source of obstruction is the fæcolith, which is nothing more than a bit of inspissated fæces which has been compressed and moulded by the persistent and repeated peristaltic efforts of the appendix to force the material beyond an isthmus in its lumen. This isthmus may be the normal narrowing at the outlet which we frequently see in the appendix, or a stricture due to fibrosis or kinking, or perhaps the pressure of a band of adhesions. This explains why my correspondent from the Pacific coast observed that cases with large single fæcoliths are much more apt to perforate early.

The fæcolith may be forced on into the cæcum or may drop back into the appendix, and so the attack of obstruction passes off and the patient recovers. But if the obstruction is not relieved the distension of the appendix shuts off the blood supply, the part of the organ distal to the

obstruction dies, peristalsis ceases, and so does pain; so also, the nausea and vomiting. There is little or no elevation of pulse or temperature and the leucocyte count shows little or no change from normal. On physical examination about all that can be found locally is a most circumscribed area of tenderness over the appendix, *with perhaps some muscular rigidity*. This latter may be very very slight, if not absent. Slight or absent rigidity is particularly common in children. Given a patient presenting this picture, I am sure that from the viewpoint of "appendicitis" no one could do any more than suggest that perhaps it would be a safe thing to have the appendix removed. Humanity being as it is, one could only expect a very few patients to consent to operation under the circumstances, while, as a matter of fact, *this is the time that* the patient should be told that he is in grave danger and that an operation done immediately is absolutely urgent. Appendectomy can be done at this stage without any fear of complications and there is no need of drainage. Diagnosis depends on the immediate history and local signs.

Following this stage a sign develops which I have found of great help in confirming the stand of urging immediate operation; this sign is seen in the uppermost part of the gastro-intestinal tract. The breath is becoming a bit foul, the tongue and mucous membrane of the mouth drying, and the throat parched. This can be best illustrated by referring to an example.

A confrère at his summer cottage complained of abdominal cramps, nausea and vomiting and diarrhœa, beginning early in the morning. There were a number of other medical men summering close by. Several of them came to his assistance. His temperature and pulse were watched, a blood count was done, and after an all-day worry on the part of the whole group the pain ceased and all was quiet. Everybody, including the patient, went to sleep deciding he "had eaten something", but not before his physician father, who was some two hundred miles away, had been notified. The elder doctor started for home as soon as possible, arrived during the late evening, and asked me to drive out to the summer colony and see his son. On arrival I had some little difficulty in awakening the household, and I really believe that the good man's wife resented my disturbing their rest after such a trying day. Being admitted to the patient's bedroom, the peculiar foul odour of his breath was evident. He had then been free from pain for some three or four hours and sleeping quietly. There was slight elevation of temperature, little or no increase in pulse rate. On examining the abdomen there was slight rigidity and a small area of intense tenderness on deep pressure over the cæcal region. After a bit of persuasion he was on his way to the hospital in the back of my car, but, in spite of all haste, operation revealed obstruction of the appendix and extensive gangrene. Recovery was uneventful, but had he gone until morning things might have been vastly different.

This appendix, like many others in the obstructive group, was retrocæcal and in these cases local tenderness is the more difficult to elicit early and rigidity slight or absent till rupture. The same applies to an appendix located low in the pelvis. In such cases rectal or vaginal examination is absolutely necessary and should be carried out not only early but frequently, and until the diagnosis has been made.

The first responsibility for the recognition of obstruction rests with the family medical attendant, then with the surgeon. If either be called regarding a patient who complains of severe abdominal pain in either the umbilical or cæcal region, either intermittent or continuous with periodic acute spasms, acute obstruction of the appendix must be suspected. Diagnosis of obstruction (before rupture) demands immediate operation. If the pain is periodic and local tenderness not definite one may leave to return in not more than two hours. During the interval *no medication* of any kind should be given—*certainly no cathartic and no analgesic; nothing* should be allowed by mouth, not even a swallow of water. Perhaps a hot-water bottle might be prescribed to ease the mind of the family. The obstruction may be overcome as previously outlined, or fermentation within the closed lumen may be slight or absent. On second examination, should pain not have occurred and local tenderness cannot be elicited either from in front, in the loin, or by the pelvic route, small amounts of water are permissible, and a recheck in two hours, with definite instructions that should there be a return of pain or any other symptom of obstruction this be notified at once. Should one be consulted a bit later when there has been an exudate of infective material through the damaged wall of the appendix there will be more signs of local peritonitis and operation is urgent.

Should the evidences be those of an already ruptured appendix the advisability of operation is perhaps doubtful. If early after the rupture, operation *may* be life-saving and must be considered most seriously. Later, when there is a diffuse peritonitis, it would seem that we *may* have reached the point where it is "too late for the early operation" and expectant treatment *may* give better results. In very late neglected cases—delay for localization is advisable.

Until some such classification as the above has been adhered to through several long series of cases one cannot hope to come to a definite conclusion as to the value of the late, early operation for acute obstruction of the appendix. It is doubtful if there ever can be any definite generalization on this point. But it is definite now that if obstruction of that part of the intestinal canal known as the appendix is treated by removal before there is rupture the mortality from acute appendicular disease will be greatly reduced.

I quote Wilkie verbatim on this point.

"This is a very fatal form of intestinal obstruction, because it is of the closed-loop variety which tends to early gangrene. If we would but realize that a sudden and complete obstruction of the lumen of an appendix containing fæcal matter will, from the pressure of the decomposing content, inevitably lead to tension gangrene within six to twenty-four hours, and that gangrene will be followed by perforation, with the escape of stinking fæcal content into the free and unprepared peritoneal cavity, we would regard the recognition of the onset of such an obstruction as one of the most important and responsible duties of a medical practitioner."

He makes a point of the drawn, anxious facies in diagnosis, and says the patient is usually conscious that there is something wrong inside and welcomes the suggestion of an operation. Certainly, I have noted how quickly some people jump at the proposal for operation in this condition. My impression is that they are not the great majority.

A great deal has been written on the influence on the mortality of the various types of anæsthesia and the location of the incision. I do not feel that these are of any major consequence, though I personally rather prefer spinal anæsthesia[10] and a modified McBurney incision, as described in a previous article.[9]

In conclusion, the following points are stressed.

1. Sir David Wilkie's original articles, as listed in the references, should be carefully studied.

2. Acute disease of the appendix should be conceived of as being firstly, inflammatory, and, secondly, obstructive.

3. In all appendicular cases a persistent effort should be made to differentiate between these two types of condition, clinically and pathologically.

4. Obstruction of the appendix should be looked upon as a true type of intestinal obstruction and not as an inflammatory disease of the appendix.

5. In the future the analyses of appendiceal mortality should be made under these two heads.

6. When intestinal obstruction — appendiceal is suspected immediate appendectomy should be urged and the patient warned of the tremendous danger in delay.

If such be our attitude in the future the very fine contribution to our knowledge made by Wilkie more than twenty-three years ago should bear fruit, and the mortality rate in appendiceal disease should show a progressive decrease rather than a progressive increase.

NOTE.—In this number of the *Journal* there appears an editorial by Dr. Edward Archibald, Professor of Surgery at McGill University. This completes the replies to my questionnaire. The editorial speaks for itself. I greatly appreciate the time and thought that Dr. Archibald has given to this matter.

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SULPHANILAMIDE IN CEREBROSPINAL FEVER.—R. Tiffeneau and J. J. Meyer state that sulphanilamide is not only an effective drug in the prevention and treatment of streptococcal infections, but also in various other infections, such as those caused by the meningococcus, pneumococcus, gonococcus, *B. coli*, and *B. typhosus*. Intrathecal injection is unnecessary in cerebrospinal fever, and the dosage by the mouth should be some 6 g. every twenty-four hours, an initial dose of 3 g. being followed twelve hours later by 1.5 g., which is then given every six hours. When the temperature has fallen, the meningeal signs have disappeared, and the cerebrospinal fluid has become normal the daily dose should be reduced to 3 or 4 g. In the infant the daily dose should not exceed 2 g. In most cases of cerebrospinal fever administration of sulphanilamide by mouth is sufficient to effect a cure in from one to three days. In severe forms serum treatment is also indicated.—*Paris méd.*, September 18, 1937, p. 215. Abs. in *Brit. M. J.*

CLINICAL ASPECTS OF PRÆCORDIAL PAIN*

BY W. FORD CONNELL

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PAIN arising anywhere near that region of the body in which the heart is situated is apt to give rise to much more anxiety and concern than is warranted by the severity of the symptom. The reason is obvious. Yet it is the commonest of clinical experiences to find that the most anxious patient, with the most obvious præcordial pain, is suffering from no form of organic heart disease and is in no danger whatever of dying, while another with the most trifling symptoms, which he is diffident to mention and inclined to dismiss as of no importance, is being afflicted by that syndrome so much feared by the first class of patient — angina pectoris.

This rather hackneyed subject has been chosen for discussion because it does not as yet seem to be generally realized that the great majority of all cases in which there is complaint of pain in the front of the chest can be adequately diagnosed and treated without recourse to other than the most ordinary methods of physical examination, combined, not with any complicated laboratory or instrumental procedures but, and this is important, *with a most painstaking history-taking.*

Most of the patients I see with pain in the front of the chest or thereabouts are sent to me because it is considered possible that the symptoms complained of are cardiac in origin. Of the last 166 such cases seen in the past year nearly one-third had no discoverable form of organic heart disease, nor was any other satisfactory organic cause found for their pain. This group, whose pain is definitely *not* imaginary, but of psychogenic origin — is naturally extremely important. It will be discussed under the general heading of neurocirculatory asthenia.

The other most important causes of pain in this region of the body were angina pectoris, accounting for some 38 per cent of the cases, and coronary thrombosis—10 per cent seen in acute attacks, and a further 10 per cent seen with angina, but with definite evidence from history and electrocardiogram of old thrombosis. Chronic disease of the gall bladder was quite an important group, constituting 8.4 per cent and introducing one of our most difficult differential diagnostic problems. Only 5 per cent of the cases fell into other than the above categories, the pain being due to secondary malignancy, intercostal neuritis, syphilitic aortitis, etc.

We shall get farthest in the short time at our disposal if we first of all tackle angina pectoris and state concisely when it may definitely be said *from the history alone* that a patient has angina, and when it may just as definitely be said that he is *not* suffering from this important syndrome. A patient has angina if, being over the age of 50 and a male, he comes complaining of an uncomfortable sense of constriction or tightness, felt beneath the mid-sternum or slightly to the left of this point, provoked by definite effort, particularly following meals, and often accompanied or relieved by the belching of gas. The constriction may grow into an intense gripping or burning pain, and may radiate widely to one or both shoulders, arms, up into the neck, jaw, or behind the ears, or down into the epigastrium. It is of only a few minutes' duration, and is relieved by rest and by nitroglycerin. The diagnosis may even be angina if our patient is a female, but usually only if she also has some degree of hypertension. Hypertension may be present in the male anginal subject too, but in the female, in whom angina is only one-fourth as common, it is almost invariable.

Our patient has angina, given the above history, even if on physical examination the cardiovascular system is entirely negative. It is usual, in fact, to find a heart normal in size or only slightly enlarged, whose sounds and rhythm are normal, and which may even, in nearly one-third of cases, give a normal electrocardiographic curve. Since the symptoms that constitute angina invariably reflect a condition

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Medicine, June 23, 1937.

of relative cardiac bloodlessness, developing under varying degrees of cardiac work, it is common to find evidence of generalized arteriosclerosis, reflecting the coronary narrowing which is the essential underlying pathological basis. If the coronary sclerosis is of conspicuous degree it may produce rather characteristic changes in the electrocardiogram, but it will not commonly give rise to enlargement of the heart unless associated with other causes of enlargement, such as high blood pressure or aortic insufficiency. This latter condition, when marked, is particularly prone to induce angina, sometimes of extreme degree, since it gives rise to unusually low diastolic pressure in the aorta, and it is during diastole that the coronaries fill.

It is to be remembered always that angina pectoris is not a single clear-cut disease but is a well-defined group of symptoms, arising whenever a sufficient degree of bloodlessness is induced in the heart muscle or some part of it by a suitable combination of circumstances. In severe anæmia, for example, even with slight coronary narrowing, the degree of anoxæmia may be sufficient to produce severe angina, which may entirely subside following anti-anæmia therapy. Hyperthyroidism is another condition tending to greatly aggravate or precipitate any slight tendency towards angina already present. Moreover, this condition in older persons is often most atypical and will only be recognized if the possibility is constantly borne in mind in every case of angina. Once recognized, its radical treatment may cause an entire subsidence of the cardiac symptoms.

At this point it should be noted that the nervous make-up of the individual patient has much to do with the ease with which he develops angina. A phlegmatic person may have most extreme coronary disease and yet complain of apparently trifling symptoms; others may have a highly sensitive nervous mechanism which responds with hair-trigger delicacy at the first appearance of relative cardiac ischæmia. The assessment of the part played by the nervous factor in each case is most important when it comes to prognosis and to treatment.

Before we consider the negative side of our diagnostic problem it would seem wise to discuss briefly the picture which follows on coronary thrombosis—the syndrome of cardiac infarction. Most victims of coronary thrombosis have had angina pectoris, although it may have been overlooked, or labelled as "indigestion". Occasionally, an attack of thrombosis may come "out of the blue" and this is especially true of younger patients, in a certain proportion of whom the etiology is infection rather than degeneration. We may generalize that cardiac infarction is rare under 40, and is most likely to occur in males over 50, as does angina. It is remarkably rare in patients with rheumatic endocarditis or aortic syphilis. Since arteriosclerosis is the basic predisposing lesion, we will be able to demonstrate a greater or less degree of this in nearly all cases. The familial tendency to arteriosclerosis and cardiovascular disease in general is most striking, both in our cases of angina and coronary thrombosis.

High blood pressure is the rule in the patients who develop thrombosis, there being invariably a sudden and sustained drop with the occurrence of the attack.

The typical picture following cardiac infarction consists in the onset, usually during rest, sometimes *following* a period of heavy exertion or excitement, of pain which commences, like the angina of effort, as a sense of substernal oppression which usually grows to agonizing intensity. This pain may radiate as does angina. It differs, however, in its onset during rest and in its long duration, lasting with continuous unfluctuating severity for 10 to 12 hours, unless dulled by morphine. The clinical picture is characterized by two other features besides the pain—*dyspnœa* and *shock*. The dyspnœa is the result of the insult to the heart as a whole. The signs of cardiac embarrassment may sometimes dominate the picture, there being at times sudden and fatal pulmonary œdema, or, more usually, the slow onset of congestive heart failure. The patient presents the usual features of shock, either mild or severe. The pulse may become quite impalpable, and the patient may become pale, cyanotic, cold and clammy. In a few hours, if he survives, his temperature rises, and there is quite a marked leucocytosis. A pericardial friction rub may be audible. The cardiac rhythm is usually unaltered, although gallop rhythm is not infrequent; the pulse usually quickens, but sometimes may slow strikingly.

This is the typical picture. Many patients die instantly following thrombosis, without developing any of these symptoms. Some die in

a few hours, or days, or may succumb to complications, embolic or otherwise, in the second week. A surprising number survive even really severe attacks, to make at times an excellent recovery. We are only now beginning to realize how very many do make a good come-back (nearly 80 per cent in fact) with the increasing frequency of diagnosis of the mild and atypical cases. In this work the electrocardiograph plays a most important part, and at times is indispensable.

The cases which give difficulty are, first, those in whom the symptoms are so mild as to be overlooked and for whom no doctor is called, and, secondly, those in which pain is quite absent or is atypically situated. When pain is absent the syndrome consists of a picture of shock and dyspnœa (for example, the sudden onset of an attack of acute pulmonary œdema). When the pain is atypical an acute abdominal disaster is most often simulated by the sudden onset of epigastric pain, with upper abdominal rigidity, vomiting, collapse, rapid small pulse, fever and leucocytosis. One of the most valuable differential points is the presence of dyspnœa, which is uncommonly found in abdominal lesions. The previous history is of vital importance here, too.

We have now briefly surveyed the manner in which angina and coronary thrombosis may present themselves. When can we be reasonably certain from the symptomatology that we are not dealing with these rather grave conditions?

Continuous dull, præcordial ache can and does occur following coronary thrombosis, but it is much commoner in other conditions. It signifies an exceptional degree of heart consciousness. It may be present following, as has been noted, a severe coronary occlusion, and patients dying of hypertensive heart failure often complain of this symptom. Its commonest clinical association is neuro-circulatory asthenia.

Pain felt in the region of the apex beat—left submammary pain, is practically *never* angina—particularly if it is described as being sharp and stabbing or neuralgic in character. It too is typical of neuro-circulatory asthenia. Even if it radiates to the left arm this should not mislead us. It is true that this is the commonest radiation of true anginal pain but it is nearly as common with pain of psychogenic origin. Pain produced during exertion is not angina, if it can be shown that only certain exertions involving twisting movements of spine or trunk, or of the left arm produce it. Such pain is obviously of somatic origin—due to spondylitis, intercostal neuritis, myositis, etc.

Pain which suggests gall-bladder disease (either gall-stone colic or suppurative cholecystitis) may indeed be cardiac, probably not angina, more likely coronary thrombosis. Patients with undoubted gall-bladder involvement do have attacks of coronary thrombosis far too frequently for the association to be coincidental. I can only advise an open mind in all such cases, both cardiac and gall-bladder diagnoses being considered.

Many other conditions may superficially simulate angina or coronary thrombosis. I have even known a broken rib to do so. Aortic syphilis is one disease which should be mentioned. In addition to its propensity to induce typical anginal seizures through the involvement of the mouths of the coronary arteries it possesses a characteristic pain of its own, dull, nagging, nocturnal pain of a distensive or neuralgic type, due apparently to stretching of the nerve endings in the aortic wall.

Neuro-circulatory asthenia is a very real entity, with very real pain; it made up the bulk of those cases which in the war were tagged D.A.H., and it is just as common in civil life as it was then, perhaps more so. Some might prefer to call it the "effort syndrome", and recently an English writer, rightly revolting from the term "pseudoangina", has used what seems to me a scarcely less objectionable term to describe it—"angina innocens". It is much commoner in females than in males and the age group affected is on the average 15 or 20 years younger than those with angina. This syndrome is essentially just a part of the neurasthenic reaction which may develop whenever environmental difficulties are met with. Substantially, as the result of the development of a state of nervous tension, the individual loses his sense of well-being, becomes fatigued, and becomes intensely conscious of the functioning of one or more of his organs. In many, probably due to some individual difference in make-up, the predominant symptoms are those of heart consciousness.

Three chief symptoms are complained of—*palpitation, præcordial pain* and *breathlessness*. The palpitation is merely an intense awareness

of the normal but over-acting heart, responding excessively to all stimuli. The pain complained of is usually more or less localized in the left submammary region; it is often a dull steady ache, which the patient tries to relieve by pressure or rubbing, despite the fact that there is nearly always an area of intense tenderness about the centre of the aching area, (which it is important to elicit on examination). The ache may last for days at a time and is supplemented by sharp stabs which often radiate down the left arm. Associated are many other nervous symptoms—dizziness, headaches, numbness, hot flushes, etc. Breathlessness is an invariable complaint. On analysis, this consists merely of intense consciousness of the normal respiratory act, and a feeling as though not enough air were being obtained. The patient seeks relief therefrom by frequent deep, sighing respirations, (the hall-mark of the neurasthenic). Sometimes the sense of suffocation is acute and the patient may rush out of doors and may breathe for a few minutes with quick panting respirations. There is never orthopnœa or cyanosis.

While the majority of patients exhibiting this syndrome are found on examination to be completely free of organic disease, there is nothing to prevent a patient with any type of organic cardiac disease developing this symptom-complex in addition to whatever signs or symptoms his organic disability has produced. Finally, it is not at all uncommon to find essential hypertension associated with neuro-circulatory asthenia, and of course these patients, after, as it were, "crying wolf" for twenty years or more may eventually develop serious myocardial impairment.

I cannot discuss treatment here. I can only plead that an essential pre-requisite to successful therapy is complete and certain diagnosis. The physician must be confident, and the patient must know that the physician is confident, of the nature of the symptoms complained of. If the patient has angina I do not believe in lying to him. It may not always be necessary or desirable to label his condition bluntly, but it is possible to discuss with him, frankly but tactfully, the nature of his condition, and to give him faith, hope and encouragement, while at the same time telling him enough so that he can best avoid attacks and prolong his life. Remember that the prognosis in angina is often infinitely better than may seem possible, and much better certainly than was taught a few years ago; so never give a bad prognosis to the patient. It may make him much worse, or, on the other hand, he may get better in spite of it and confound your judgment.

If the patient has not angina it is usually possible to be sure of this by careful history and physical examination alone. Sometimes, it is worth while, for your own and the patient's satisfaction, to supplement clinical judgment with electrocardiographic and radiological study. Granted you are dealing with a case of neuro-circulatory asthenia, a few hours spent in searching examination, followed by complete and unhurried explanation and reassurance, will do more for your patient, and, incidentally, for your reputation as a physician, than all the medicines in the pharmacopœia.

PREVENTION OF POST-OPERATIVE THROMBOSIS.—C. Crafoord administered heparin post-operatively to counteract a tendency to thrombosis. In the first series of cases it was found that this treatment prolonged the time of coagulation and also increased the tendency to bleeding in the area of operation. The substantial fall in blood pressure, the increase in the pulse rate, and the rise in temperature which were observed in several cases may have been due to the large doses of heparin, especially as some of the preparations used were of a relatively low degree of activity. It was decided to postpone further experiments until preparations of 100 per cent activity were procurable. In the second series of cases, in which the preparations used were of a uniform degree of purity and strength, there were no post-operative signs of toxicity. It was found that the doses had less effect administered post-operatively than in normal cases. In order to eliminate the risk of bleeding the first dose was not given until three hours after operation, but, as in two cases small subcutaneous hæmatomata were formed, it is proposed to lengthen still further the interval between the end of the operation and the first administration of heparin. No signs of post-operative thrombosis or embolic complications were observed in any of the cases, not even in one in which thrombosis had occurred after both a previous delivery and an operation. Although the results have so far been satisfactory, it is considered necessary to try this treatment in a larger number of cases before any definite conclusions regarding its usefulness can be drawn.—*Acta chir. scand.*, 1937, **79**: 5, p. 407. Abs. in *Brit. M. J.*

GASTRO-INTESTINAL HÆMORRHAGE*

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THE object of this paper is to emphasize once more the seriousness of gastro-intestinal hæmorrhage, and to call attention to a comparatively new and somewhat revolutionary form of treatment. The sudden loss of a large quantity of blood, whether from the gastro-intestinal tract or from the lungs, constitutes one of medicine's major catastrophes, and as such demands frequent and serious consideration in such meetings as this.

The causes of gastro-intestinal hæmorrhage, apart from blood dyscrasias, are the same as the causes of hæmorrhage elsewhere in the body, and are due to the erosion and opening of a blood vessel secondary to a definite ulcerative process. Since ulcerative lesions of the gastro-intestinal tract are most frequently found at or near the pylorus any discussion of gastro-intestinal hæmorrhage must be concerned largely with gastro-duodenal lesions. The next most frequent site of gastro-intestinal ulceration is in the lower small intestine and the colon. We will limit our discussion to gastro-duodenal lesions.

The character and the extent of the hæmorrhage may vary all the way from a slow constant oozing to a sudden severe loss of blood which almost completely exsanguinates the patient. The hæmorrhage may be a single one or may recur every few days. The severity of the hæmorrhage will vary according to whether it is coming from an artery, a vein, or a capillary. The size of the vessel itself and the presence or absence of blood dyscrasias will also influence the extent of the loss of blood. The age of the patient is an important factor, as shown by the fact that in young, healthy adults the normal elasticity of the vessel walls will tend to stop the flow of blood, while in the aged in whom the vessels are sclerosed and their normal elasticity has been lost they will tend to remain open and so favour the continuance of the hæmorrhage. The size of the lesion itself does not bear much relationship to the amount of blood lost; small ulcers sometimes prove fatal, while certain large ulcers cause very little or no bleeding.

The hæmorrhage, if it occurs high in the gastro-intestinal tract and is gross in character, will practically always be vomited; if it is slight in amount it may be wholly retained and passed as melæna. Blood appearing in the intestinal tract distal to the first few inches of the duodenum is practically always retained and passed as melæna. The question of vomiting or not vomiting the blood is unimportant, and does not in any way detract from the seriousness of the condition. The vomiting of blood, however, does give some visible idea of the amount of blood lost, and is a valuable aid in persuading the patient to seek the aid of his physician.

Considering a patient who has vomited a large quantity of blood, the pertinent question arises, where did it come from? Not all vomited blood has its origin in the stomach or duodenum. At times, relatively unimportant causes, such as epistaxis or a bleeding tooth, or blood from the nasopharynx or larynx may account for the presence of blood in the stomach. Blood escaping from the trachea or lungs may be unknowingly swallowed, only to be vomited or passed as melæna later. Excluding such extraneous causes of bleeding as the above, the great majority of cases of gross hæmorrhage will be found to be due to intrinsic gastro-duodenal ulceration, either acute or chronic. The next most frequent cause is cirrhosis of the liver with splenic anæmia or Banti's disease.

In a study, published in 1932, of 668 consecutive cases of patients who came to the Mayo Clinic because of hæmatemesis, the relative frequency of the lesions responsible was as follows: (1) intrinsic gastro-duodenal lesions 90.5 per cent; (2) cirrhosis of liver with splenic anæmia or Banti's disease 5.1 per cent; (3) all other causes 4.4 per cent.

INTRINSIC GASTRO-DUODENAL LESIONS

Bleeding from gastro-duodenal lesions may be due to any of the following causes.

Trauma.—A blow to the abdomen may injure the walls of the stomach or duodenum and cause

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a hæmorrhage, especially if an ulcer is already present. Swallowed articles, such as glass, nails, pieces of metal, may erode the mucosa and produce bleeding.

Chronic gastric, duodenal and gastro-jejunal ulcer.—Because of the greater incidence of duodenal than of gastric or gastro-jejunal ulceration duodenal ulcer becomes the most frequent cause of high gastro-intestinal hæmorrhage. More than 50 per cent of the total number of patients coming to the Mayo Clinic on account of hæmatemesis had duodenal ulcers. These ulcers are usually old, chronic, indurated ones with thickened edges, and may bleed from erosion of a fairly good-sized vessel, usually in the base of the ulcer, or there may be a slow oozing from the congested area surrounding the active ulcer, or the bleeding may occur from the breaking-off of granulation tissue during the healing of the ulcer. This type of bleeding may be mere oozing or it may be sudden and profuse.

Although gastric ulcer is much less frequent than duodenal, the bleeding is of essentially the same character as that which occurs in the duodenum, and clinical differentiation is often impossible. Occasionally (in 2 to 3 per cent) following gastro-enterostomy intended to cure ulcer of the stomach or duodenum, a reactivation of the old ulcer may occur, or a new ulcer may develop at the new opening. Ulcers in both of these locations seem to have a marked tendency to bleed.

Gastro-duodenal ulcers usually manifest themselves by a train of dyspepsia symptoms extending over a period of months or years. Such cases are fairly common, and practically in 100 per cent a certain amount of bleeding occurs at some time during the course of the disease, but only a small percentage ever bleed to an alarming degree. Hæmorrhage, however, may be the first symptom of a so-called "silent" duodenal ulcer, and Mayo Clinic statistics show that 8 per cent of ulcers have hæmorrhage as the first symptom to attract the patient's attention. As an example of this latter type of case, I shall relate briefly a case history.

CASE 1

G.B., male, 26 years of age, single, clerk, first consulted me on June 9, 1936, complaining that on the evening previous, while coming home from a summer resort, where he had gone in his usual health, and in company with some friends, he was seized with abdominal pain and cramps, nausea, vomiting and diarrhœa, and that he had fainted. This was an entirely new experience for him, and he attributed it to some Hamburg sandwiches and pop which he had eaten before coming home. None of his friends, however, were similarly affected. There was no previous history of dyspepsia nor any other indication of serious systemic disease. Physical examination failed to reveal the presence of pain, soreness, tenderness or rigidity of the abdomen. The patient was given an alkaline mixture and sent to bed. Next day he felt all right; he had no more diarrhœa, and felt he could go to work the following day. I saw no more of him until after the next week-end, when he went to visit a friend, who happened to be a laboratory technician in a small hospital. She, being alarmed at his pallor, did a blood count which showed a Hgb. of 45 per cent and 3,400,000 red blood cells. These findings were confirmed, and as the patient was working and felt well, he continued to do so. He was advised to stay on a soft, non-roughage diet, and to take some iron by the mouth. His strength and vitality quickly returned, and I saw no more of him until four months later (October 15, 1936), when he came in again saying that on the previous night he had passed a large black stool, and he felt a little dizzy and weak. From stool tests, the blood count, and his history it was evident that he had suffered another hæmorrhage, even in spite of the fact that he still had no stomach complaints whatever. An x-ray examination taken at that time failed to reveal any definite disease, and the evidence for definite ulcer was inconclusive. The patient was put to bed in the hospital, and after a week returned to his home in another city. Further x-ray examinations at a later date failed to reveal where the bleeding came from. He is now back working and feeling well.

While we lack definite x-ray confirmation of an ulcer in his case, clinically he has to be regarded as having a bleeding ulcer and must govern himself accordingly.

Gastritis, duodenitis, mucosal erosion, acute ulceration.—Single or multiple areas of acute inflammatory reaction in the mucous membrane of the stomach or duodenum without definite evidence of a break in the mucous membrane may be the cause of gastro-duodenal hæmorrhage. The relationship of these acute inflammatory areas to chronic ulcer is not understood, but they do seem to have a definite relationship to acute ulceration. Small inflammatory areas become denuded of mucous membrane, and as several such areas coalesce an acute superficial ulcer may be formed. The bleeding from such areas is usually of a slow oozing type and rarely becomes gross in character. Such bleeding, however, may become very serious because of its slow insidious character and long continued duration.

Carcinoma of stomach.—Practically all carcinomas of the stomach bleed at some time during the course of the disease. Such bleeding is usually slight and rarely gross in extent. If excessive hæmorrhage occurs it is usually the result of a direct ulceration into a large-sized vessel by the growth and is frequently part of a terminal picture. The bleeding in cases of

gastric cancer is usually the result of ulceration of the wall of the stomach or of necrosis and sloughing of papillary growths.

Other types of malignant growths may be the cause of severe bleeding, as shown by the following.

CASE 2

G.D., male, aged 53 years, was first seen in August, 1935, for an acute bronchitis. An analysis of the blood at that time revealed Hgb. of 70 per cent and 4,900,000 red blood cells.

He was seen again in January, 1936, at which time he complained of marked weakness, and loss of strength and endurance. He gave a history of dyspepsia after eating for the previous twelve years, with no adequate attempt at medical or dietary control. He had never vomited. Shortly before admission he had been having tarry stools, and his sisters remarked on his increasing pallor. Physical examination showed a marked pallor, a large nodular enlargement of the thyroid gland, and a rough systolic murmur at the apex. Laboratory examination showed Hgb. of 35 per cent and red blood cell count of 2,900,000. The stools gave a persistently positive test for blood. Gastric analysis showed a total acidity of 25 and a free HCl acid content of 11 after histamine stimulation; there was no evidence of blood in the gastric content. X-ray examination suggested an indefinite lesion, thought to be either a polyp or a diverticulum in the prepyloric region of the stomach. There was no gastric retention. The patient was given a blood transfusion and advised to return in a week for another.

Before the week was up he had another severe hæmorrhage and returned to the hospital. Examination then showed Hgb. of 30 per cent and a red blood cell count of 2,200,000. The patient was given seven blood transfusions during the next eighteen days and then explored surgically. At operation a diffuse, trabeculated, infiltrating mass was found in the plyoric end of the stomach which on removal and section proved to be a lymphosarcoma.* Recovery was uneventful and he continues to be in good health.

Benign tumours of stomach and duodenum.—Benign tumours of the stomach constitute less than 0.5 per cent of all stomach tumours. They are usually polypoid in nature, and may be the cause of severe anæmia due to prolonged loss of blood. If of sufficient size they will be demonstrable by x-ray examination as a filling defect in the lumen of the stomach. Pathologically, they are usually fibroadenomas, fibromyomas, myomas or hæmangiomas.

Other less frequent causes of gastro-duodenal hæmorrhage are such conditions as tuberculous and luetic ulceration, rupture of œsophageal or stomach varices, congestion of the circulation secondary to heart disease. Hæmorrhage from cholecystitis or appendicitis probably never occurs *per se*, but such conditions may act as foci of infection for hæmorrhagic lesions occurring in the gastro-duodenal area.

* This case will be fully reported at a later date.

MORTALITY

True mortality rates in bleeding ulcer are hard to determine. Among the mass of statistics now available the following from England may be quoted: Hurst (1924), about 4 per cent; Bulmer (1932), 10 per cent; Chisman (1932), 25 per cent. From the United States, Goldman (1936) reports a total mortality of gross hæmorrhage from peptic ulcer to be 15 per cent; Ledbetter reports the same figure.

Another series of cases analyzed by Aitken (1934) from the London Hospital gives a considerably more serious picture than do the above statistics. From this series of 255 cases 27, or 11 per cent, died of exsanguination. Considering the whole series such a mortality rate does not seem particularly serious, but, as he points out, in many of the cases the hæmorrhage was not of sufficient severity to greatly endanger the patient's life. If the mortality figures, therefore, are restricted to those cases which were considered grave and in which the patient's life seemed endangered, he found that 27 out of 63, or 43 per cent died. His classification of what constituted a grave case was purely clinical, and was restricted to those cases having Hgb. of 20 per cent or less and a red blood cell count of 2,000,000 cells or less. While this is an arbitrarily-set division of cases, it nevertheless gives a more accurate picture of the true severity and seriousness of gross and severe hæmorrhage than is found in other reports.

TREATMENT

There is no absolute uniformity in the management of gastro-duodenal hæmorrhage, whether it be hæmatemesis or melæna. This is probably due to the fact that no one individual has had the opportunity of comparing any large series of cases under different types of management.

Treatment of the case that has slight bleeding or only oozing does not present a serious problem, and many recover without any special measures or even without medical supervision. The cases of severe or repeated hæmorrhage, however, are problems reaching the proportions of a major catastrophe and cannot be passed over lightly. These are cases that are represented by the 43 per cent mortality rate in Aitken's series; these are the cases that break up your night's rest and turn your hair grey.

The generally accepted medical regimen for bleeding ulcer is absolute bed rest, with plenty

of morphine and atropine to keep the patient quiet, and relax any muscular spasm which may be present. From this point on the treatment varies. Some authorities advise absolutely nothing by mouth for two to five days while others allow only small, scanty feedings of soft bland non-irritating foods, such as cream of wheat, milk and cream, and custards. Following this starvation period the diet is very slowly and carefully and gradually increased in amount and variety over a period of several weeks, during which time the patient continues not only to be exhausted from his gross loss of blood but is actually kept in this exhausted state by a starvation type of medical regimen. Theoretically, this starvation treatment aims to abolish all peristaltic waves in the stomach, but we have no physiological confirmation that any such idea is in reality correct. From a practical standpoint the mere presence of blood, a protein substance, in the stomach, will be a stimulus for digestion and peristaltic movement. Similarly with the use of alkalies. If alkalies are of any use, and most physicians believe they are, in neutralizing the acid stomach content of an ordinary peptic ulcer, why should a patient be penalized by withholding them just because his ulcer is bleeding?

As a result of the above arguments certain changes in the treatment of patients with gross hæmorrhage seemed inevitable, and in 1933 Meulengracht, of Copenhagen, reported the results he had obtained in treating hæmatemesis and melæna by giving his patients something to eat, *i.e.*, a varied diet from the first day and plenty of it. The reasons which led him to do this were as follows: (1) that exhausted patients often died following hæmorrhage, in spite of the starvation treatment and scrupulous dieting; (2) that sometimes patients with protracted hæmorrhage stopped bleeding when they were given food; (3) that very often ambulatory patients recovered from severe melæna without making any particular change in their diet at all. Again in 1935, in *The Lancet,* he reports the results of his "treatment with food" of a series of 286 cases of gross hæmatemesis and melæna. Of these 251 were considered to be due to gastro-duodenal ulcers. Among these 251 patients there were only 3 deaths, one being due to perforation with general peritonitis, one to profuse hæmorrhage seventeen days after starting treatment; and one died before "treatment with food" had been instituted. If the last case be omitted, this gives a mortality rate of only 1 per cent, the lowest mortality rate on record. He then compares this mortality rate with a similar series of cases treated in another hospital in Copenhagen on the usual orthodox starvation treatment, where there were 22 deaths, or a mortality rate of 7.9 per cent in 289 patients. He further states "This radical change in mortality brought about by 'treatment with food' is due to something beyond its effect on the hæmorrhage itself. For my experience is that patients with hæmatemesis and melæna do not usually die until 8 days after hæmorrhage begins. Thus in my opinion they do not die directly from loss of blood, but rather from general exhaustion, often with complications. This exhaustion is no doubt primarily the result of their anæmic condition, but it is accentuated by the extreme insufficiency of food and drink with which they are supplied at this critical moment. To me this is the explanation why with 'treatment with food' we get a mortality so much lower, for, instead of weakening the patient still more, we are giving him support when he badly needs it."

This treatment consists in giving the patients a full purée diet, together with one teaspoonful three times daily of a mixture of sodium bicarbonate and magnesium subcarbonate 15 g. each, and hyoscyamus extract, 2 g.; also ferrous lactate 0.5 g. three times daily. The purée diet includes at 6.00 a.m. tea, white bread and butter; at 9.00 a.m. oatmeal with milk, white bread and butter; at 1.00 p.m. dinner; at 3.00 p.m. cocoa, and at 6.00 p.m. white bread and butter, sliced meats, cheese and tea. The dinner includes a variety of dishes, such as meat balls, broiled chops, omelet, fish balls, vegetable, meat or fish, mashed potatoes, vegetable purées and soups, cream of vegetables, stewed apricots, apple sauce, gruel, and rice and tapioca puddings. The food is puréed, and the patients are allowed to have as much as they want.

Before leaving the subject of treatment, blood transfusions and surgical procedures must be considered. Blood transfusions are useful, and often life-saving in severe cases. They can be repeated regularly every twenty-four hours or as necessary according to the severity and frequency of the bleeding. They not only replenish blood lost by an exhausted patient but also

supply certain coagulating elements which have become depleted by the frequent hæmorrhage.

Surgical procedures, when done, should aim to find and control the bleeding point. Any attempt to correct the pathological process which produced the original ulcer should be delayed until a later date, when the patient has recovered from his hæmorrhage. Such procedures in patients who have had frequent severe hæmorrhages are undertaken with considerable reluctance by most surgeons, because of the risk involved in operating upon a patient already *in extremis*. The problem often is made even worse by not knowing the exact location of the bleeding point. The patient, however, who only has an occasional hæmorrhage should be advised of the possibility and seriousness of repeated hæmorrhages, and urged to have a surgical attack made on the bleeding area between periods of gross hæmorrhage.

Briefly we may summarize the treatment of hæmatemesis as follows.

1. In the less severe cases; ordinary medical regimen.

2. In grave cases; medical regimen, morphine, transfusions.

3. If bleeding continues we may have to resort to surgery in spite of the risk involved.

4. In the patient who bleeds only occasionally; medical regimen for the hæmorrhage, and surgical attack upon the ulcer between periods of bleeding.

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ANÆSTHETIC PROCEDURES AS STANDARDIZED FOR CERTAIN TYPES OF OPERATION IN A LARGE GENERAL HOSPITAL*

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IN any large hospital staffed by experienced anæsthetists and equipped with modern anæsthetic appliances there are a number of factors which influence the anæsthetist in his choice of an anæsthetic agent or method. Complicating states in the patient to be operated upon, individual preferences on the part of the patient, surgeon or anæsthetist, the cost of the drug, are conditions which must be reckoned with in this selection. In teaching hospitals the necessity of instructing the beginners in anæsthesia in the fundamentals of the science to some extent limits the choice. The varying influence of these and perhaps other factors undoubtedly effects differences of technique in various institutions and localities. In our anæsthetic service it has happened in the course of time, sometimes after trial and error, that for certain operations some particular agent or technique appeared to be the most advantageous in the conditions surrounding our group. It is probable that a similar situation has developed in other groups. In view of the constant interchange of ideas in this connection between hospital anæsthetic staffs in different localities and of the value to be gained therefrom, the writer ventures to record the various techniques employed at the moment in the hospital with which he is connected.

Neurological surgery.—Some of our techniques have been established after various searchings for the most suitable method, and in no instance, perhaps, is this better exemplified than in the case of neurological operations, the majority of which are carried out under general anæsthesia. For several years these cases were given insufflation of ether by the endotracheal route with fairly good results. There were, however, occasions on which, when the position of the head was changed during the operative procedure, the airway was disturbed, with the inevitable consequence of congestion and bleeding. In succession, rectal ether and tribromethanol were employed and the combination of each of

* A paper read at the Sixty-eighth Annual Meeting, Canadian Medical Association, Section of Anæsthesia, Ottawa, on June 23, 1937.

these with local infiltration of procaine. Due to the rather wide variation in the effects of these drugs in different individuals, difficulty was experienced sometimes in maintaining the desired level of anæsthesia for the length of time that some of these operations require. For the past two years or so we have been using ether with a Magill endotracheal catheter inserted when the patient is anæsthetized to a point at which coughing or straining does not result, the anæsthesia being then maintained by means of a motor-driven vaporizer. There is no direct connection between the catheter and the delivery tube from the machine, the ether vapour being blown beneath a mask covering the end of the tube. Change of the position of the head does not affect the airway. It is felt that with a motor-driven vaporizer a lighter level of anæsthesia may be maintained than is possible by dropping ether on the mask. In any case these patients recover consciousness quickly, even when the anæsthesia lasts for three hours or more. An effort is made, of course, to induce anæsthesia without excitement, chloroform being used, if necessary, to promote this end. The neurological staff believe this method to be the most satisfactory that we have yet used. For encephalography tribromethanol is employed for those patients not sufficiently cooperative for a local anæsthesia.

Surgery of the head and neck.—For other operations about the head and for block dissection of the glands of the neck this same procedure proves satisfactory. Frequently, however, we use endotracheal insufflation of ether as one has access to the patient if the airway tends to become obstructed. In private patients and in others when specially indicated the endotracheal administration of cyclopropane replaces the more unpleasant ether. Some use is also made of the endopharyngeal administration of this gas, for which purpose the Leech or the Shipway airway is employed.

Thyroid surgery. — In operations upon the thyroid gland, nitrous oxide, being the least toxic, is the anæsthetic of choice. We give enough preliminary sedative to ensure at least a quiet patient. As soon as the patient is anæsthetized a combination of thyroid nerve block and local infiltration is effected by the surgeon, with the result that, except when traction is being exerted upon the gland itself, frequently analgesia is all that is necessary. It is believed that under these conditions, interference with the recurrent laryngeal nerve is more easily recognized. Cyclopropane is reserved for those patients not easily handled in this manner, but it is felt to be less suitable than nitrous oxide because of the possible danger of initiating cardiac fibrillation in the thyrotoxic patient, the certainty of more bleeding, the high incidence of post-operative retching, and the undesirable depth of anæsthesia that is almost certain to follow.

Thoracic surgery.—Before the introduction of cyclopropane spinal anæsthesia with procain was the method of procedure in thoracoplasty involving the lower chest. In view of the higher percentages of oxygen permissible when cyclopropane is used, this anæsthetic seems specially indicated in these cases, complicated, as they frequently are, by low vital capacity. It is our choice at the moment.

In pulmono-lobectomy for bronchiectasis we employ spinal anæsthesia when the middle and lower lobes are in question, and have done so for several years. Because many of these patients were in more or less advanced stages of the disease, and as a consequence not good risks for an inhalation anæsthetic we believe our choice of spinal anæsthesia to be sound. In these cases we prefer procaine to nupercaine, the only other drug much used for spinal anæsthesia on the service, because with the former, in contrast to nupercaine, the preponderant effect falls on the sensory rather than the motor roots. The average dose is 250 mg. dissolved in 10 c.c. of spinal fluid placed in the third or fourth lumbar interspace. A review of this work has been published.[1] Since the introduction of cyclopropane most intra-pleural operations for conditions other than bronchiectasis are managed with this drug rather than with the sub-dural block formerly employed. For pneumonectomy and lobectomy for bronchiectasis involving the upper chest the same anæsthetic is used. In these patients the endotracheal technique is always followed. For this purpose we employ the largest catheter that can be conveniently passed through the glottis after it is fitted with a Guedel-Waters cuff. It is imperative in these operations to acquire the complete control of respiration which a closed system furnishes. The larger

catheter insures an easy airway and facilitates the removal of embarrassing secretions.

Abdominal surgery.—Some six or seven years ago sub-dural block anæsthesia replaced ether in most of our abdominal work. For some time procaine was used almost entirely. In upper abdominal work we were driven to large dosage, as much as 350 mg. being used for gastric resections, in an attempt to procure sufficient length of effect. For the past three years we have used nupercaine, 1:1,500 solution, by a technique following closely that of Howard Jones,[2] and have found it to give greater satisfaction to the surgeon and to the anæsthetist alike. We believe that this drug, when used for spinal anæsthesia, has several distinct advantages over procaine. After an extensive trial it is our opinion that there is definitely less circulatory depression, as evidenced by blood pressure and pulse reading, and less change in colour than is the case when large amounts of procaine are used. Further, because of the preponderant effect on motor rather than on sensory roots cyclopropane supplementary anæsthesia will maintain good relaxation as late as 2½ or even 3 hours from the time the anæsthetic is injected, should the patient experience pain during the later stages of the operation. We can produce anæsthesia of 1½ to 2 hours' duration in most cases without the necessity of supplementation by other anæsthetics. In upwards of 80 per cent of all cholecystectomies, common bile duct investigations, and gastric resections which include some risks that cannot be considered first class, our choice is nupercaine spinal anæsthesia. Many of these patients receive from 1,000 to 2,000 c.c. of normal saline by the intravenous drop method in the 24-hour period immediately prior to operation. The poorer risks may be given a blood transfusion before or during the operation. We consider that the extra degree of relaxation obtained by spinal anæsthesia is of distinct advantage to these patients, and that this factor has been responsible to a considerable extent for the lowered operative mortality rate that has been enjoyed in the past several years by our surgical services in this type of surgery. The dosage employed is from 15 to 18 c.c., the larger dose being used in large males in good general condition. The patients are placed in the prone position for about eight minutes with the head of the table elevated about five degrees. A small pillow is inserted beneath the upper chest in order to protect the cervical cord. We believe it important to give enough preliminary sedative to induce light sleep, a combination of morphine, hyoscine and nembutal being used to this end. Few of these patients cause any real concern during the operative period. Epinine, combined with ephedrine, is invariably effective in combating any circulatory depression that may arise. We have had one death on the table with nupercaine, and it is debatable as to whether in the case in question this drug was the chief offender. In the aged and in very poor risks cyclopropane by the endotracheal route is preferred to spinal anæsthesia. In a few cases ether is given, preferably in a closed system.

For other abdominal operations, such as bowel resection, in which the operating time is likely to exceed one hour nupercaine spinal anæsthesia is the usual procedure. For appendectomy, through a gridiron incision, cyclopropane is satisfactory for most patients, spinal anæsthesia with procaine being employed for robust patients or where the patient or surgeon expresses a desire for this anæsthetic. If a patient insists on a general anæsthetic, when complete relaxation is needed, small amounts of nupercaine placed sub-durally materially assist in obtaining this result. Under these circumstances less time is consumed because the prone position is not necessary, and is, in fact, contraindicated.

For pelvic operations on ward patients open ether is used most frequently, spinal anæsthesia with either procaine or nupercaine being reserved for difficult cases. This choice of open ether is dictated chiefly by the fact that these patients seem most suitable for the instruction of the inexperienced intern or student because of the comparative freedom from post-operative respiratory and other complications which they enjoy. Private patients of this nature are given cyclopropane or a spinal anæsthetic depending chiefly on the preference of the patient or surgeon.

Genito-urinary surgery.—For operations on the kidney nupercaine spinal anæsthesia is used in most good risk patients. The anæsthesia is induced with the table level, the side to be operated upon placed uppermost and the patient

left in that position. An average dose of 12 c.c. of the 1:1,500 solution produces satisfactory results. For doubtful and poor-risk patients cyclopropane is substituted. The choice of anæsthetic in patients presenting for supra-pubic prostatectomy is determined chiefly by the age of the patient and the condition of his cardiovascular system. The younger and such older patients as are considered good risks are given spinal anæsthesia with procaine in moderate dosage, about 120 mg. The complete muscular relaxation and the drier field resulting therefrom would seem to warrant this procedure. For more elderly men and those with cardiovascular damage cyclopropane is preferred, as being less dangerous. In longer operations about the bladder nupercaine is preferred to the dosage of procaine necessary to gain sufficient length of operating time.

Transurethral resection of the prostate is frequently carried out with caudal block with metycaine. Thirty-five c.c. of a 1.25 per cent solution in distilled water is effective in many cases, nitrous oxide usually sufficing to complete the anæsthesia in the partial failures. Cyclopropane has been used by some members of the staff, although it is possible that this procedure is not entirely free from the explosion hazard. Moreover, the continuous flow of blood in the field is troublesome. Some surgeons prefer spinal anæsthesia for this purpose, and some of the better-risk patients are handled in this fashion, procaine dissolved in small amounts of spinal fluid being used.

Orthopædic surgery. — For minor operations of this nature cyclopropane has proved to be very useful. In more extensive operations, such as those affecting the hip joint, spinal anæsthesia with nupercaine is mostly used, although it has not yet been established to our satisfaction that the spinal block minimizes surgical shock. Spinal bone graft may be carried out in this fashion. When a patient presents with a vital capacity impaired by scoliosis or other causes it is felt that cyclopropane is the anæsthetic to be desired and the endotracheal technique the most advantageous.

Operations about the anus and perineum.— Caudal block with 30 c.c. of a 2 per cent solution of procaine is used frequently for hæmorrhoidectomy. We prefer metycaine for this purpose, but up to the present time the supply of this drug has been limited. Cyclopropane gives fairly good sphincteric relaxation, and is used when a general anæsthetic is indicated. For operations about the perineum spinal anæsthesia or cyclopropane is chosen, depending chiefly on the preference of the patient or surgeon. The anæsthetic staff has not as yet acquired that skill in effecting transsacral anæsthesia that is necessary if this procedure is to be acceptable to patients and busy surgeons. We readily admit that in many instances this method is highly suitable.

On our service we make little use of tribromethanol, possibly, partly because of the time factor. In plastic operations about the face and in certain eye operations, it has been of particular service.

The appeal to us of the intravenous employment of barbituric acid derivatives has been such that their use is confined chiefly to those cases in which it is inconvenient to give an inhalation anæsthetic. For short operations about the head, some eye operations, and where the use of the cautery or diathermy gives us some concern, evipal and later pentothal have been of real value. Otherwise, we rarely use these drugs.

About the only use we have made of vinyl ether up to the present is as a supplement to cyclopropane, when relaxation with this agent is not readily obtained. Five or six c.c. allowed to evaporate into the circuit seems to be more suitable than ethyl ether for this purpose. We have not as yet noticed any undesirable effects from this combination.

Chloroform alone is used only where a cautery or diathermy is used in the mouth or throat for a longer time than may be obtained with the usual dose of intravenous barbiturates. These patients are induced with nitrous oxide, with some ether and chloroform used to maintain the anæsthesia.

Obstetrical analgesia for ward patients is carried out by interns with a chloroform and ether mixture, nitrous oxide being used only when specially indicated. Nitrous oxide, during contractions at first and later continuously, by the direct flow method rather than closed, is used for private patients. We find cyclopropane to be superior to nitrous oxide for difficult delivery and Cæsarean section.

The anæsthetic staff of our hospital comprises a chief and six assistants, most of the latter not

confining their practice to anæsthesia. We have a resident anæsthetist whose term of service is one year. One intern is assigned to the service each month for instruction. Each final-year student is attached to the service for one week for the same purpose. The members of the anæsthetic staff rotate from month to month on the various surgical services, and each assumes the responsibility of arranging all anæsthetics on his own service. Our hospital has 1,100 beds.

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URTICARIA*

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THERE must be very few persons who reach middle life without experiencing an attack of urticaria or "hives". Usually the cause is quickly ascertained by the patient without recourse to the services of a physician, and by avoiding the offending drug or food or contact no further attack occurs. There remain, however, a residue of people who suffer from it for years, and chronic urticaria is one of the most baffling problems that the physician is called upon to solve, and for the patient one of the most distressing of the common diseases of the skin.

The urticarial lesion is identical with Sir Thomas Lewis's experimental reaction, "the triple response". If the normal skin is firmly stroked there occur in a few seconds: (1) Active local dilation of the capillaries, producing an erythema confined to the line of the stroke. This is independent of innervation. (2) A minute later a more diffuse response due to relaxation of the arterioles surrounding the line of the stroke and visible as a wide flush or "flare". This is brought about through a local nervous reflex. In some persons these are followed by (3) œdema or whealing due to increased permeability of the vessel walls (factitious urticaria or dermographism).

Lewis's work has proved that the triple response is due to some diffusible substance derived from damaged epidermal cells, and there is strong evidence that this substance is histamine. If a drop of diluted histamine be placed on the skin and a prick made through it a perfect triple response is evoked.

The histamine content of the epidermis is 24 mg. per kilo., equal to a solution of one in forty thousand, and capable of evoking a flare and a wheal if pricked into the skin. Injured skin contains the same amount of histamine as normal skin, but in a short time the concentration diminishes, due to absorption into the blood stream, and if the amount so absorbed is adequate there occurs a systemic reaction which is the counterpart of the first stage of Lewis's triple response, a general capillary dilatation accompanied by a marked drop in blood pressure and symptoms of shock.

It sometimes happens that urticaria and shock symptoms occur together, as in experimental anaphylaxis, a reaction which has been proved to be due to the interaction of antigen and cell-fixed antibody. This interaction damages the cells to which the antibody is fixed and histamine or a histamine-like substance is liberated. In a sensitized person a local urticarial response can frequently be evoked by pricking the antigen into the skin, the result being identical with that produced by pricking in histamine. It is quite probable that the majority of cases of urticaria are caused by H-substance liberated from the epidermal cells by the interaction of antigen and antibody; but in many cases the H-substance is liberated from cells damaged by other means such as trauma, heat, cold, insect bites (mosquitos, lice, bed bugs, *Sarcoptes scabici*), plant and chemical irritants, ultra-violet and other short-wave radiations. In short, any injury to the epidermal cells which results in the liberating of the diffusible histamine-like substance may cause urticaria.

The epidermal cells are not the only ones to which antibody becomes fixed. It is probable that the cells in the superficial part of the dermis are those primarily affected. With an antigen

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to which a person is known to be sensitive the reaction cannot be evoked by placing it on the surface of the skin, as in the patch test. It must be introduced into the skin so as to come in contact with living epidermal cells in the deeper part of the epidermis or with the cells about the minute vessels in the cutis, and so, as would be expected, in most cases of urticaria the antigen reaches the skin from within.

With a known antigen the Prausnitz-Kuestner reaction (for short called P.K. reaction) is positive. This is an important reaction because most of our knowledge of antigen-antibody interaction is based on it. The test is performed by injecting into the skin of a normal subject a series of dilutions of serum from an allergic individual, and as a control a series of corresponding dilutions of serum from a normal person; the two lines of injection being parallel. Twenty-four hours later the antigen is injected into all the sites, giving a positive reaction in the one line and a negative in the normal control. It has also been found that if the antigen is injected at some distance from the site of the serum injection the reaction occurs just as before, at the site of the serum injection and nowhere else, proving that only traces of antigen are required and also that the antibody remains cell-fixed at the site of injection. Further, if in a case of food allergy the positive serum is injected into the skin of a normal person a wheal will form at the site of the injection within two hours of his eating the specific food. One wheal desensitizes the site, the antibody being neutralized in the interaction with antigen. In the absence of antigen the site remains sensitive for several weeks, the cell-fixed antibody only slowly disappearing.

Heat and cold are recognized but are not common causes of urticaria. I recently saw an example of cold sensitiveness in a girl aged fourteen years. The attacks of urticaria began two years previously and occurred in the winter and only on exposure to cold. She had taken up swimming in a local pool last summer, and on two occasions had fainted shortly after coming out of the water. Horten and Roth[1] have pointed out that collapse while swimming is the most dangerous consequence of hypersensitiveness to cold. The explanation is that cold causes increased permeability of the tissue cells and permits the diffusion of the histamine-like substance, and when there is a sufficient concentration in the general circulation shock symptoms are produced. If this occurs while swimming death is certain unless rescue is effected at once. Of the many drowning accidents occurring every summer in Canada some are undoubtedly attributable to this cause. Fortunately, systemic desensitization to cold can be accomplished by having the patient immerse the hand in ice water for two minutes twice daily for a month. Patients can also be desensitized to cold by the subcutaneous injection of 0.1 mg. of histamine twice daily for two to three weeks.

Acetylcholine is another substance capable of causing vasodilatation. It is known to be set free by the parasympathetic nerves at the periphery and its sudden liberation is probably sometimes the cause of neurogenic urticaria. Emotional stress is a well recognized cause of urticaria, and I recall the case of a woman who developed a generalized attack every time she became angered. This emotion, however, through stimulation of the sympathetic nerves causes a liberation of adrenalin, which is antagonistic to acetylcholine, and urticaria following anger is difficult to explain. Two factors may be involved, anger merely being the spark.

I have recently used acetylcholine successfully in a case of local blanching of the skin. The patient for two years has had an area of skin on the left side of the nose about three-quarters of an inch in diameter, which on exposure to moderate cold and also after briskly rubbing the nose, became blanched as if frozen, the rest of the nose remaining unaffected; this is the opposite to the urticaria reaction. He is now able to restore the blanched area to normal by rubbing into it 2 per cent acetylcholine in a lanolin base.

It is known that protein may pass unchanged through the intestinal villi. Intracutaneous tests with the offending protein are positive. Many times, however, the patient is sensitized not to whole protein but to a product of the digestion of whole protein. This product may be a proteose, a peptone, a peptide, a polypeptide, or even an amino acid, and, of course, skin tests using the mother proteins of these substances are useless. On the other hand, since the number of possible protein derivatives is in the neighbourhood of 100,000, skin testing with them is not practicable.

It is often observed that urticarial attacks frequently coincide with a gastro-intestinal up-

set, and, although difficult of proof, it has been suggested that as a result of abnormal digestion aberrant protein derivatives are formed and it is one or more of these to which some persons become sensitive. Routine fractional gastric analyses in urticaria have been undertaken by various workers, but the results have been somewhat contradictory, probably because only small numbers of tests have been made. Since 1929 fractional gastric analysis has been part of my office routine in all patients with urticaria. One hundred and forty-six such patients have been examined, the duration of the urticaria varying between the extremes of three weeks and fifteen years. The test meal consists of a glassful of water and two arrowroot biscuits. Four specimens are examined, one taken before the meal and three at half-hour intervals after. Free acid is estimated by titrating with decinormal sodium hydroxide solution, using dimethyl as an indicator.

The results are recorded in the following table.

Achlorhydria—No free Hcl.	*Marked hypochlorhydria—Free Hcl. under 20 in all specimens.*	*Slight hypochlorhydria: low normal—Free Hcl. between 20-30.*	*Normal—Free Hcl. 30-50.*	*Hyperchlorhydria—Free Hcl. above 50 in at least one specimen.*
19 cases	41 cases	35 cases	37 cases	14 cases
or 13 per cent	or 28 per cent	or 23.9 per cent	or 25.34 per cent	or 9.58 per cent
	65 per cent			

If we accept 30-50 as normal for free hydrochloric acid it will be seen that 95, or 65 per cent, of the cases in this series have a gastric juice low in hydrochloric acid. Even eliminating the 20-30 group we still have about 41 per cent, with a distinctly low hydrochloric acid content.

The 95 patients were given dilute hydrochloric acid, the amount varying between one and one-half drachms in a glassful of water, with or after meals, and on the whole the clinical results have been encouraging, sometimes dramatic, as the following case notes show.

CASE 1

A female, aged forty, suffered attacks of urticaria almost daily for fifteen years. She had consulted numerous physicians, sometimes travelling to distant places in search of a cure. Appendicectomy and tonsillectomy had been performed. Gastric analysis disclosed a marked hypochlorhydria; two days after taking hydrochloric acid she became free of urticaria for the first time and remained so for five months. Then she went to an Alpine Club camp, three days out from Banff, where she accidentally lost her bottle of acid. The urticaria recurred next day and continued until she got back to a drug store in Banff. For the past five years she has been normal so long as she takes the hydrochloric acid.

CASE 2

A university colleague with severe urticaria for one year and achlorhydria. He was completely cured with hydrochloric acid but dare not go to a dinner party without it.

CASE 3

Giant urticaria, two years; moderate hypochlorhydria, as high as 25 in one specimen. For nearly a year he remained cured with hydrochloric acid, but the condition recurred when the acid was omitted. He was gradually able to reduce the dose, and now is normal without any medicine. Gastric analysis is now normal.

In all, 15 cases, or 10 per cent, have been completely cured with hydrochloric acid alone. Twenty others were not improved. One of these was eventually cured by the removal of a suspicious tooth, another by appendicectomy. Two patients, women in the late forties, were cured with emmenin, drachms one, three times a day by mouth. A few of the remaining patients were lost to observation shortly after starting hydrochloric acid, but the others were all improved in varying degrees. When no further improvement occurred other investigations and other therapeutic methods were adopted.

It should be remembered that there is a strong tendency for the patient eventually to become immunized. Twelve years ago I was consulted by a patient who had urticaria of a few years' duration, and I was unable to find the cause. He moved to Ontario and I lost touch with him until recently, when he wrote in reply to my enquiry that in spite of treatment the urticaria continued for a few years and then gradually subsided, and except for very occasional attacks had not troubled him for the past five years. It is well known that ordinary foods which cause urticaria in childhood eventually immunize the patient, and the same is true of insect bites; people who react violently to mosquito bites eventually become immune.

Although we have a clear understanding of the mechanism of wheal formation the cure of a patient with urticaria depends on our ability to find the cause. The first step is to rule out specific foods, and for this intracutaneous tests are on the whole unsatisfactory. An elimination diet will be found very useful. After a purge the patient is placed on a diet of milk and rice for one week. If the urticarial attacks stop one item of food is added at a time until the urticaria recurs. Then a full diet is gradually resumed, omitting the offending food. If none can be discovered the analysis of the gastric contents, which should be done in the meantime, may disclose an absent or low hydrochloric acid content and the acid with pepsin should be given a long trial. In addition, strict attention should be given to the hygiene of the gastro-intestinal tract. One-tenth of a grain of calomel every two hours, and a small saline each morning, together with colonic lavage, may help. In my experience calcium has not been of much value.

While these measures are going forward a careful examination must be made for foci of infection in the teeth, nose and throat, gall bladder, appendix, prostate, cervix, Fallopian tubes, and so on. If the patient is in the menopause placental extract in the form of emmenin may be given. Anterior pituitary extract may occasionally be useful. Some drugs cause urticaria, but the attacks as in the case of foods are short-lived, the cause being easily detected. Phenolphthalein, barbiturates, salicylates, morphine, iodides, bromides and neo-arsphenamine are among the well known causes, but recently I saw a patient in whom the attack followed the use of sodium morrhuate injections for varicose veins. Prontylin (para-amino-phenyl-sulphonamide) may sensitize the skin to light. Two patients in the Edmonton clinic developed huge urticarial wheals on the hands and face after taking 20 grains of prontylin four times a day for two days. Intestinal parasites, such as tapeworms, should be considered, and if there is any hint of their presence a vermifuge should be given. In this connection it should be remembered that although an eosinophilia is commonly found in the allergic patient it may also be caused by intestinal infestation.

The search for external causes should not be forgotten, especially scabies in a cleanly person, in whom only one or two wheals may be present at a time. Cat hair and other animal contacts have been known to cause urticaria, and more recently dermatophytes have been incriminated. Other contacts to be thought of are cosmetics, mouth washes, douches, nasal sprays, lotions, hair dyes, wool, silk, cotton, inhalent allergens, such as feathers, pollens, ephedrine and house dust. If these and other causes referred to in the early part of the paper can be ruled out non-specific desensitization may be attempted by the intramuscular injection of 10 to 25 c.c. of the patient's whole blood every five days for a month. Plenty of sleep, moderate exercise, and avoidance of mental and emotional stress are important. The psychogenic factor must never be overlooked and may in the end prove to have been the basis of an intractable urticaria.

The main purpose of this paper has been to point out the importance of the oral administration of hydrochloric acid in certain cases of chronic urticaria and to show that in our experience 10 per cent of the patients can be cured by this means alone.

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PITUITARY HORMONES IN SKIN DISEASE. — G. Pighini who had previously shown the close relation between the skin and the neuro-hormonic system especially the hypophysis, records his observations on ten cases of alopecia areata, four of acne vulgaris, and two of acne rosacea treated by intramuscular injections of extract of the anterior lobe of the pituitary. Of the ten cases of alopecia areata seven were completely cured, two showed some improvement and were not followed up, and one showed no change. Two of the cases of acne vulgaris were completely cured and two showed considerable improvement. The cases of acne rosacea were also completely cured. The pituitary treatment was combined with the administration of thyroid and iodine to counteract excessive pituitary stimulation. Injections of 1 c.cm. of the extract were given for about twenty-five days, followed by an interval of a week and then resumption of the treatment. — *Policlinico*, Sez. Prat., July 5, 1937, p. 1293. Abs. in *Brit. M. J.*

A PATHOLOGICAL STUDY OF CARCINOMA OF THE CERVIX

BY P. J. KEARNS

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WHEN studying the pathology of cancer, especially that form which occurs so constantly in the cervix, one should reflect upon the peculiarities of embryology, anatomy and histology.

The Muellerian epithelium is derived from somatic mesothelium, and invaginates downward to the region of the developing internal os. From that point downward we see a solid plug of epithelium, called the Muellerian hill, invaginating the posterior surface of the urogenital sinus, replacing the latter by a metaplastic epithelium which later in its cranial end forms the goblet epithelium for the cervical canal, and in its caudal part a differentiating squamous epithelium which covers the portio and upper part of the developing vagina. The cervical gland epithelium and the squamous epithelium of the portio should bear common embryonic characteristics, and these should be re-born in times of abnormal embryonic proliferations such as occur in carcinomatous growths. This fact is revealed when we see that corpus cancers usually remain in the corpus uteri and cervical cancers remain in the environment of the cervix. Also, the patterns of epithelium and the degree of malignancy according to these patterns remain fairly constant in the uterine cavity epithelium, while those of the cervix, whether in the canal or on the portio, bear repeated constancies in their embryonic proliferations and in their degree of malignancy because of their embryonic relationship to a parent tissue. It is incorrect to say that there is constant antagonism between epithelia at the region of the meeting of the goblet and squamous epithelium at the external os, and that by reason of this antagonism this area is the site of future cancer of the cervix. In fact there is great reciprocity of epithelium in this region, as is shown by the healing processes of erosion where the loss of one epithelium is replaced by the other.

Portio cancers usually start on the portio and cervical gland cancers in the canal proper. The anatomical position of the portio lends itself to certain irritating factors which give rise to erosion. On the one side there is the chemical influence of the mucous and serous secretions of the uterus; on the other, the acid vaginal secretions coupled with the frequent presence of bacterial irritants of the vaginal vault. Frequent traumatic insults of instrumentation and forcible dilatation of the cervix sphincter cause fissures and tears which become infected and provide for continuous hyperæmia, which, in turn, produces metaplasia. The frequent hyperplastic changes of cervical epithelium which occur in pregnancy and are followed up in the puerperium must tend to upset normal qualities of proliferation and favour metaplastic changes. This is borne out in a study of carcinoma of the cervix, and is illustrated by the relative infrequency of cancer of the cervix in nulliparous women and in the uninflamed vagina and cervix. The underlying cause of cancer in this situation, therefore, appears to be a continuous hyperæmia to the part, with resultant over-nourishment, over-proliferation, loss of normal function in the epithelium, and metaplasia. The presence of sub-epithelial nerve ganglia in the portio (Davis[1]) may influence an abnormal hyperæmia through stimulation and irritation.

Benign lesions of the cervix, such as polypi, erosions, etc., produce atypical hyperplastic epithelial changes, but the epithelium is typically arranged, as contrasted with malignant changes which produce atypical embryonic epithelium atypically arranged. The abnormal latent and inherent properties of embryonic epithelium may be released by two factors, disposition, or spontaneous hereditary qualities, and irritation. In some cases the former predominates and in some cases, the latter. We can, therefore, control the latter by removing the irritant, but we can little influence the former inborn qualities of epithelium. In reviewing our material of cervical cancers over a period of ten years we can produce five cases of extremely early portio carcinoma where there was no laceration or infection. These cases favour the theory of maximum disposition to carcinoma. The majority of our cases of cervical cancer do show, however, the

presence of inflammation or trauma, supporting the theory of irritation as an etiological factor. Our material over a period of ten years indicates that there is a greater tendency for the release of abnormal proliferative qualities of epithelium between the ages of 35 and 50. The occurrence is greater in multiparous than in nulliparous women.

The early macroscopic detection of cancer of the cervix is often obscured by the presence of accompanying pathological lesions such as polypi, papillary erosions, syphilitic ulcers, tuberculosis, and by excessive hyperplasias following in the puerperium. The fashion of the initial growth, whether of intrinsic or extrinsic character, is of importance. Where the initial extrinsic features are predominant early diagnosis is comparatively easy, whereas if the intrinsic features prevail no surface lesion is seen; only a hard, indurating nodule is detected. Rapidly produced erosions, which are usually papillary in type, have a marked inflammatory, cellular, hyperæmic, poorly constructed connective tissue, which bleeds when traumatized, simulating the cellular poorly organized growth seen in carcinoma. Schiller's iodine stain is of practical value in such cases, and detects the proper site for probe excision.

We divide the well recognized macroscopic carcinomatous growths of the cervix into four degrees according to their anatomical position: (1) where the growth is seen to involve the cylinder of the cervix; (2) where the entire depth of the cervical musculature is infiltrated; (3) where the immediate attachments of the uterus, such as the parametria, utero-sacral ligaments and fascia are involved; (4) where the bladder, bowel, or lymphatic glands outside the uterus are involved.

In reviewing our work for the years 1930 to 1936 we find that 20 cases belong to the first degree, 43 to the second, 121 to the third, and 35 to the fourth. We also learned that the greater percentage of the 22.5 per cent five-year cures belonged to the first and second degrees. It is also interesting to compare the growths of the cervix with those of the body of the uterus. We find that 85 per cent of carcinomas of the uterus are on the portio, 11 per cent in the fundus, and 4 per cent in the cervical canal. It is fortunate, therefore, that the greatest percentage of carcinomas of the uterus appear upon the part most easily examined, emphasizing the importance of a discriminating macroscopic study of the portio.

The microscopic findings are of incalculable value in the early diagnosis of cancer. We prefer the histological differentiation taught by O. Frankl.[2] (1) A deviation from the normal size, shape, and staining qualities of cells. Desmoplastic properties are altered. (2) Atypical relationship of one cell to the other. Polarity of cells is altered; they do not advance side by side, but lie obliquely, transversely, and often overlie each other in several layers. The mitotic figures are increased. (3) Atypical relationship to the neighbourhood. Heterotopic properties are altered. (4) In addition to the first three is a tissue reaction in lymphocytes and in young, clear, round connective cells which lies between the invading epithelial cells and the true fixed maternal tissue. This reaction is only seen in early primary growths, not in metastatic growths. This type of exudate must be distinguished from that seen in inflammations where leucocytes, lymphocytes and plasma cells prevail. The above rules are equally applicable to columnar or squamous epithial growths.

Our material has been reviewed in regard to the bearing which the histological structure of a growth has on its susceptibility to radium. The radio-sensitiveness of a tumour is usually inversely proportional to the degree of embryonic differentiation. In 1912 Schottlaender and Kermauner[3] classified cancers of the cervix according to the degree of anaplasia or redifferentiation exhibited by the growth, and grouped them into mature, half mature, and immature types. Broders,[4] in 1920, in a study of cancer of the lip, skin, and genito-urinary system, depended greatly upon the microscopic appearance. He divided squamous cancers into four groups according to the degree of differentiation they showed toward normal squamous epithelium, and stated that surgical excision improved the condition according to the maturity of the cancer. Martzloff's[5] method of classification also depends upon the degree of differentiation, but he also takes into account the regularity and irregularity of the histological pattern and the amount and character of stroma present. He uses the terms spinal cancer cells for those seen in the superficial stratified layer of cervical epithelium, transitional cancer cells for those resembling the middle-cell layer, and spindle cancer cells for those representing the basal-cell layer. The shape of the cell, cell membrane,

staining of the nucleus, and the amount of cytoplasm are also considered. This classification, therefore, is an individual one, and is not practical for teaching purposes. In our clinic we prefer the histological classification of high maturity, mid-maturity, and low maturity, as taught by O. Frankl in his lectures (1927). From 1930 to 1936 we had 219 cases of carcinoma of the cervix of which 14 were high maturity carcinomas, 40 were mid-maturity, 107 low maturity, and 58 were unclassified. At the end of 5 years 7.14 per cent of the high maturity carcinomas were living, 12.5 per cent of the mid-maturity, and 13.08 per cent of the low maturity.

A careful study of the lymphatics leading from the uterus must be made in considering the spread of carcinoma from the cervix. In this clinic we apply the anatomical classification of Wertheim, who grouped the various glands of the lymph tract leading from the uterus into four stations. The first lymphatic station is in the transverse parametrium; the second is in the region of the promontory and takes in the sacral, iliac, hypogastric, and promontory glands collectively; the third station is intermesenteric; and the fourth takes in the cœliac group beneath the diaphragm. These glands are not involved in an orderly consecutive manner, but most irregularly and independently. A wide dissection of all palpable pelvic glands, therefore, will not always assure a permanent cure because all palpable glands are not carcinomatous but may be hyalinized from previous inflammation; conversely, all carcinomatous glands are not palpable and may be overlooked in dissection.

Of vast importance in the prognosis is the site of carcinoma in relation to the lymphatic glands. Carcinomatous spread from the fundus, therefore, must travel through long, tortuous lymphatics in the wall of the uterus, while a portio growth has a less tortuous, shorter course before involving the first gland station in the transverse parametrium. Cervical canal cancer, however, growing as it does primarily and essentially intrinsically, has a short, direct route to the first gland station, with consequent early metastases. An extensive portio growth which involves the vault of the vagina has access to innumerable lymphatics in this region, and these connect with the above-mentioned system. The prognosis in such a lesion, therefore, is less favourable than in a portio growth proper.

The effects of deep x-ray and radium upon cervical cancers will depend partly upon the position, size, and maturity of the growth, and partly upon the sensitivity of the embryonic epithelial cells to the emanations. The presence of acute inflammatory reaction increases the hyperæmia and often delays radical treatment. We have recently been applying deep x-ray before radium and studying the effects upon the carcinoma cells. We have also been studying the cell changes after radium treatment and trying to adjust dosage to reaction in cells. The cell degeneration is similar to, but less marked, following deep x-ray than radium. About ten days after radium applied therapeutically the nucleus ceases to divide at the area treated, vacuolization appears in the cytoplasm, and further immediate destruction of surrounding tissue ceases. There are, however, individual cells of very high resistant qualities often lying in the middle of degenerating areas which remain highly mitotic, apparently unaffected by the emanations, so it would appear that a careful histological study of the growth should be made with each re-application of radium in order to perfect the dosage.

I am indebted to Miss Bessie Stewart, R.N., Radium Technician, for the statistics used in this paper; and to Mr. W. J. Plumpton for his assistance in compiling this report.

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THE TREATMENT OF PULMONARY TUBERCULOSIS AFTER FORTY

BY JULES PRÉVOST, M.D.

Montreal

PULMONARY tuberculosis is particularly frequent in adolescents, young adults and adults. However, it is well known that subjects of forty years or over are not spared by the disease. I believe that this group of patients reacts to treatment in a way of its own. For example, they do not seem to progress as favourably as others with collapse therapy. The age-factor should be given greater consideration, and, bearing in mind the anatomical and clinical diagnosis, greater discrimination should be exercised in adopting any one mode of treatment. Yet, the age of forty cannot be taken as a strict and definite limit after which the treatment of tuberculosis is to be considered from a radically different viewpoint. It is considered merely in a general way. In presenting this paper I exclude all cases of tuberculosis which, while having attained the age of forty, have, nevertheless, been afflicted with the disease for many years. Assuming that these patients have been receiving appropriate treatment, the same is to be continued regardless of age, excepting, of course, the cases in which previous treatment has shown poor results and for whom a change is advisable. I shall consider only those patients showing signs of active tuberculosis after having reached the age of forty. There is, unquestionably, a large number of such.

I do not intend to discuss here the clinical aspects and modes of evolution of tuberculosis. However, before discussing treatment, I should like to point out the two chief clinical types which are usually observed.

1. In the first type of patient, who in his youth had an attack of pleurisy or pleuro-pulmonary congestion, but who is actually in apparently good health, one is confronted suddenly with a high fever concomitant with pulmonary signs or a hæmoptysis.

2. The second group of patients includes those who had confirmed tuberculosis during adolescence. After an indefinite period of treatment they were considered as healed and permitted to resume a normally active life, then suddenly, after many years, there is a new outbreak.

Pulmonary tuberculosis in a patient over forty can generally be traced to a lesion, often minute and very old, signs of which were apparent during the patient's youth. The clinical varieties are extremely numerous, and, although a tendency towards sclerosis is most frequent the caseous and ulcerative forms are often encountered. On the whole, pulmonary tuberculosis which develops after forty has no peculiar characteristics either as regards its clinical aspects or its evolution.

TREATMENT

Climatic treatment. — Climatic treatment is, unquestionably, one of the essentials. While collapse therapy in certain cases may give more rapidly gratifying results, nevertheless, a strict sanatorium regimen in an appropriate climate remains one of the most important conditions of success. Absolute rest, together with energetic therapy and sanatorium regimen, is of greatest importance for these patients.

In the case of young patients the selection of a given climate is guided by certain factors pertaining mainly to the evolution. Such is not the case for the older patients. No standard formulæ can be applied here, since each case requires individual consideration. One cannot be too particular in this respect. Before making a decision the patient should not only be submitted to a thorough examination and the clinical aspect of his case taken into careful consideration but the following factors, of a general nature, should also be granted considerable attention: (*a*) actively progressive forms and repeated hæmoptyses are a definite contra-indication to sojourn in a climate of high altitude; (*b*) marked sclerosis frequently entails severe dyspnœa; (*c*) chronic nephritis with albuminuria, cardiac insufficiency associated with arterial hypertension, tendency to acute congestive manifestations, varices, hæmorrhoids, etc., contraindicate high altitudes, particularly so in the case of those with definite cardiac lesions; (*d*) aged subjects, particularly sensitive to cold, frequently show a marked loss of weight

at high altitudes. This can be checked only by their return to a more temperate climate at a lower altitude. In short, patients with congestive manifestations and sensitivity to cold should be directed to a medium or low altitude.

Which forms derive the greatest benefit from this mode of treatment?

Statistics show that among the patients of forty years or over treated and improved by sanatorium regimen the majority were bearers of fibrous lesions or lesions with a tendency to fibrosis. In these cases sclerosis seems to have been hastened by sanatorium regimen and a cure more rapidly effected. Therefore one cannot insist too much upon the necessity of detecting, as soon as possible, fibrous manifestations in older subjects. Spontaneous cure by sclerosis should not be taken for granted. On the contrary, in order to avoid precious loss of time these patients should at once be placed in adequate sanatoria.

Sanatorium regimen effects an entirely different result in aged patients who are the subjects of a caseous form of tuberculosis. In this group of patients sanatorium treatment, while slowing up the progress of their lesions and causing a definite decrease in their congestive manifestations, has been shown to be unable to effect by itself sclerosis and healing of their lesions.

Tuberculosis in older patients may often assume an ulcerative form having a rapidly fatal termination. Rest in a sanatorium is of greatest importance for these persons. However it is generally insufficient. It may effect for a short time a certain improvement which, however, is generally but temporary.

Artificial pneumothorax.—The efficacy of immobilization and compression of the lung by means of artificial pneumothorax has been definitely proved. Do the results apply to tuberculous patients over forty? Articles written on this subject relate frequent immediate failures and insufficient or negative results in the older patients. Particularly demonstrative are statistics which include a large number of patients. One gathers from them that, after forty, the number of cases in which artificial pneumothorax can be realized is considerably limited, since only one patient in four derives any benefit therefrom. Successful results cannot be expected without strict sanatorium regimen, which is absolutely essential for these patients. Results are often uncertain and deceiving in older patients who are allowed to remain in their own surroundings while artificial pneumothorax is maintained. This mode of treatment should be applied only when the patient can be assured a prolonged rest in a sanatorium.

Experience has shown that in the majority of these cases artificial pneumothorax is of doubtful value because of its numerous difficulties and complications. First in order is the difficulty of effecting it, separation of the pleura being frequently impossible. Failure of this mode of therapy is not restricted to the older patients, but it seems to be much more frequent in this group. The possibility of separating the pleura is quite doubtful even in cases with central lesions not affecting the surface or in cases where there is no previous history of pleural reaction. Moreover, even in cases where the separation of the pleura has been successfully accomplished untoward incidents frequently spoil the potential beneficial effects. Extensive adhesions, which cannot usually be overcome, often prevent the compression of the lung. Moreover, often being tempted to continue the insufflation in the hope of obtaining a more complete collapse of the lung, one risks the formation of pleural effusions most unfavourable to the patient. Artificial pneumothorax is not only often impossible to realize; not only do adhesions hinder effective compression, but it seems that pleural effusions are particularly frequent in subjects over forty. Even more, empyema as a result of artificial pneumothorax should be very seriously considered. This complication is rather rare in young persons but older subjects are particularly subject to it. One should, therefore, not be astonished at finding purulent effusion in these cases. It would seem that at a given period, and without any apparent determinating cause, the resistance of the pleura suddenly gives way to a rapidly severe infection. This is one of the main characteristics of artificial pneumothorax in the aged. Whenever the general condition of the patient is deficient empyema is to be feared. Blocking the pleura with oil in certain cases of artificial pneumothorax complicated by febrile empyema gives most unsatisfactory results, since death ensues either by cachexia or bilateralization of the lesions. Therefore, oleothorax is of little value in artificial pneumothorax with empyema. It is not my intention to cast discredit upon a mode of treatment which has so definitely proved its value, but it must be

RENAL AND URETERAL ANOMALIES*

BY W. L. RITCHIE

Montreal

IN the study of anomalies, I think that in the genito-urinary system we encounter a greater variety of both congenital and acquired types than is found in any other part of the body. This is perhaps explained by the fact that in part many of these anomalies are composed of right and left duplications, and also in part, by the manner of development embryologically.

Renal anomalies have long been familiar to the anatomist and the pathologist, but in the case of the surgeon and urologist it has only been since the development of roentgenological methods of examination that a fuller appreciation of them has developed, and with the increasing popularity of roentgenological examinations their demonstration is becoming quite common. These anomalies have been shown to occur much more frequently in the male than in the female.

It is a general law in medicine that an abnormal organ is more susceptible to pathological changes than a normal one, and as these anomalies in the kidneys are being found with increasing frequency the need for careful employment of every method of examination is therefore emphasized. But what is even more important is close and unselfish teamwork between the urologist and roentgenologist.

In our hospital we insist on a very definite routine procedure. First, plain plates are taken in all cases; the plain plate has proved to be very informative, often suggesting the type of the subsequent examinations to be made, and is frequently referred to as a "re-check". This is followed by a retrograde filling and plates taken prone, erect, and with partial withdrawal of the catheters for ureteral studies. When necessary intravenous pylograms, cystograms, and frequently gastro-intestinal examinations by the barium meal and barium enemas are made.

Probably the most complete classification of renal and ureteral anomalies is that of Papin and Eisendrath, but for this paper, I have used a shorter classification, as it covers the more frequently encountered anomalies, and those which I felt could be discussed in the period of time allotted. It is difficult to separate completely renal from ureteral anomalies, and so I have combined the two.

KIDNEY

1. *Number.*—The normal number is, of course two, *viz.*, right and left, but it can be decreased or be in excess.

(*a*) The solitary kidney. This is considered a very rare anomaly, and is due to the failure of the ureteral bud to develop, and consequently is associated with an asymmetrical trigone. This, therefore, should only be diagnosed when there are no traces of the opposite kidney.

(*b*) A supernumerary kidney is probably the rarest of all abnormalities and must not be confused with reduplication of the pelvis and ureters, *i.e.*, the double or bifid kidney. Only about thirty authentic cases have been reported. There are four forms: (1) pseudo-double—single mass of parenchyma with two pelves and single ureter; (2) two kidneys with two ureters, uniting to form single ureter; (3) same as above, but the two ureters opening separately into the bladder; (4) two kidneys with the ureter of the upper opening into the pelvis of the lower. This is the most common type.

2. *Position.* — (*a*) Ectopia. — Acquired. — In this type the kidney has reached the normal position in the loin, has a blood supply coming off the aorta at proper level, and has a ureter of normal length, and then gradually has wandered from its normal position. These cases are classified as lumbar, iliac or pelvic, depending on the degree of descent. It may be unilateral or bilateral. The renal pedicle being elongated, we see the ureter kinked and tortuous.

(*b*) Congenital ectopia.—This condition is due to failure of the embryonic kidney to make its normal ascent. These are described also as pelvic, iliac or lumbar, may be unilateral or bilateral, and may be in the last-named either symmetrical or asymmetrical in position. All

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such ectopias are known as homolateral. In contradistinction to these are the heterolateral or crossed ectopias, in which one or both of the kidneys have crossed to the opposite side. Radiographically, as the result of failure of rotation, the pelvis is situated anteriorly and of unusual outline, and the ureter, being abnormally short, leaves the pelvis at unusual angles, more often extending upward before taking its downward course.

The fused kidney.—The most common type of this group is that known as the "horseshoe kidney". This is described as the union of two kidneys to a lesser or greater degree at their mesial borders. So long as one-half extends beyond the midline of spine, the anomaly belongs to this group. The degree may vary from a narrow fibrous band to a complete parenchymatous fusion. They may be normal in position or lie in the pelvis, and may be single or double. In a plain plate, kidney shadows rather lower than normal, close to the vertebral column, with clearly defined outline except at lower poles, are very suggestive of such, and in the pylogram one usually sees the defect of rotation of the pelves, which face forward and have the calices on the anterior surfaces. Gutierrez has worked out a pyelographic triangle that is of interest. He stated that normal kidneys show a 90 degree basal angle, whereas horseshoe kidneys have less than 20 degrees.

3. *Structure.* — Hypoplastic kidney, renal aplasia, and congenital absence of one kidney are often confused. These all represent embryonic defects or lack of development during interuterine life. Radiologically, the hypoplastic or infantile kidney is small, with small sacculated pelvis, and the calices either absent or multiple and abbreviated. The ureter is patent. In aplasia the pelvis is absent, the ureter not patent, and there is no function.

Another type of kidney that some writers consider as an anomaly of structure, while others do not classify as such, is the polycystic kidney. However, as they are practically always congenital in origin, I have included these as an anomaly. These are usually familial. They are generally bilateral, although cases are on record of unilateral involvement.

In the radiological examination of polycystic kidneys retrograde pyelography is the method of choice, as, because of low renal function, intravenous pyelography is usually not satisfactory. Both kidneys must be injected, as this is most helpful in differential diagnosis. One usually sees elongation of the pelvis, and the pressure of the cysts may cause the calices to become quite markedly concave. These findings, of course, are also found in renal neoplasms, but the fact of being bilateral rules out the latter. In cases of a unilateral polycystic kidney this would not be of value in diagnosis, and I can see where it is impossible to make a diagnosis radiographically in this type of case. We have never had a proved unilateral case in our hospital, and they are very rare in the literature. There are variations in the type of pelvis, another being the dilated type, where the pelvis is large and broad and the calices short and stubby. This form makes it necessary to differentiate from hydronephrosis. In the latter, while we find a large pelvis, the calices are usually clubbed and the concavities more or less lost, whereas in polycystic kidneys the calices may be blunt are nevertheless not clubbed and the concavities are present. It seems to be a controversial point as to whether the broad pelvis is really a later stage brought about by infection. Occasionally, calculi are found in these kidneys, and also cysts may rupture into pelvis.

RENAL PELVIS

Duplication.—This varies in degree and may be entirely intra-renal, all branches being within the kidney, or the ureter may divide some distance from the kidney, or there may be complete reduplication. Frequently, in the retrograde pyelogram this may be missed, depending on the level at which the ureters unite, and more complete information will be obtained by the intravenous pyelograms. Radiographically, what is most commonly seen, is a large lower pelvis, with more or less normal development of calices, and the upper pelvis is smaller and has more rudimentary development of the calices, giving what is described as the "hammer-head" type.

URETER

Here we have duplication, unilateral and bilateral; these may be partial or complete, and vary as to the point of termination and exit, *i.e.*, may end in the bladder, in the urethra or in the vagina. Diverticula are found in the ureter, and, like all such, are either congenital

or acquired. The former are the result of an incomplete attempt to form a second ureter. Practically all are found in the lower ureter.

Ureteroceles are found at the lower end and result from stricture. As these dilate they usually bulge into the bladder. It is difficult in the early stages to differentiate this radiologically from a low diverticulum.

Aberrant Vessel

Occasionally, an artery may be abnormally placed, and crosses the uretero-pelvic junction in such a manner that it causes pressure, with a resultant hydronephrosis. Usually, there is seen in the radiograph a normal ureter and the dilatation beginning at the junction of pelvis and ureter.

STAPHYLOCOCCUS TOXOID FOR RECURRENT STYES*

By Alexander E. MacDonald

Toronto

STYES often follow a period of ill health, but the condition generally yields readily when reinfection is prevented. At times this is not so, eye cups may be discarded, glasses ordered, lid margins painted, near work limited, proper lighting supplied, and still a succession of reinfections occur, without any tendency to become less virulent, much to the annoyance of the patient and the embarrassment of the physician. There may be a family tendency to staphylococcus infection as far as the lids are concerned, often coexisting with hypermetropia and a fair skin, and in dealing with this so-called minor malady I have long desired more satisfactory treatment. Vaccines, stock or autogenous, have not given good results.

In 1933 therapeutic success was found in controlling chronic staphylococcus osteomyelitis with the toxoid of this microbe, and through the courtesy of the Directors of the Connaught Laboratories and Dr. Dolman I was able to use the toxoid in the treatment of recurrent styes in the experimental stage. In 1933 Dolman, working at the Toronto Connaught Laboratories, confirmed a previous finding that the staphylococcus produces a true exotoxin which in experimental animals produced mass necrosis of tissue or even death. The addition of formaldehyde to the toxin produced a highly antigenic toxoid that increased the immunity for staphylococcus infection. Serum from the individual showed the degree of protection afforded by titration against a staphylococcus toxin of known hæmolyzing power. Some of the following clinical and private cases, especially the latter, that have been followed for over three years indicate that we have a valuable new remedy in conjunction with the usual care.

Case 1

Dr. G., aged 24, was seen September 10, 1933. He had had at least one stye every month for a year, a new stye developing before the previous one had disappeared. On examination his right upper lid was red and swollen and much pus was found on incision of the stye. An examination showed *S. aureus* in pure culture. He had previously used an autogenous *S. aureus* vaccine made from a stye without benefit.

September 14, 1933: a new stye had developed and he was willing to be the first to try the toxoid treatment; 0.05 c.c. was injected into the deltoid muscle.

September 15, 1933: patient complained of pain in his back and legs. His temperature was normal and there was a 50 by 60 mm. swollen area at the site of the injection.

September 16, 1933: the inflamed area had increased to 60 by 80 mm. The arm was tender and painful.

September 17, 1933: there was only slight discomfort although the area had increased to 80 by 100 mm.

September 18, 1933: a new stye had started, but three days later it had not developed pus, although there was moderate swelling and discomfort; 0.1 c.c. of toxoid was injected into the deltoid of the other arm, which produced less reaction.

September 27, 1933: 0.15 c.c. of toxoid was followed by slight malaise and a still smaller area of reaction at the site of the injection.

October 3, 1933: 0.2 c.c. of toxoid was injected, and when next seen on February 17, 1934, the lids were quiet. No new styes had appeared and a small papilloma was removed from the right lid under local anæsthesia.

September, 1936: the patient said he had had no styes and his lids were comfortable although he was doing moderately heavy near work.

Case 2

Miss G., aged 22. In August, 1930, a stye of the right lid had broken the previous night. The usual treatment with antiseptics and fomentation had been ordered.

September 1, 1931: a stye of the right upper lid was incised and yielded a pure culture of *S. aureus*.

September 13, 1933: a large stye was present on the right upper lid. Several had developed since her last visit.

September 14, 1933: 0.05 c.c. of staphylococcus toxoid was injected into the muscle of the leg, which produced a 67 by 73 mm. reaction. When seen the following day moderate malaise and discomfort had been experienced for 48 hours.

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September 21, 1933: 0.1 c.c. of toxoid was injected.

September 28, 1933: 0.15 c.c. of toxoid was injected, followed by a marked reaction with enlarged glands in the groin.

October 3, 1933: a new stye developed in the left eye, which was opened on October 5th, yielding considerable pus; 0.2 c.c. of toxoid was injected.

February 1, 1934: no new styes had developed and the patient made the observation that her skin had been much clearer; she had occasionally suffered from small pimples.

October 11, 1934: the lids had remained clear. The patient had been doing secretarial work and rest glasses were ordered for near work.

June 24, 1935: there has been no new stye, but the patient asked for toxoid, as it had proved beneficial to her complexion before. On examination one small red area was seen on the right lower lid which did not contain pus; 0.1 c.c. of toxoid was injected, followed on July 3rd by 0.15 c.c.

July 15, 1935: 0.25 c.c. of toxoid was injected; only the first of this series of injections was followed by any reaction. The small red area showed pus and staphylococcus on smear.

May 7, 1936: there was a localized red area and moderate blepharitis squamosa. One lash was pulled showing a small bead of pus, which did not develop.

Case 3

C.S., a boy, aged 18 months, was seen suffering from small red masses at the margin of the right upper and left lower lids. The mother said that several styes had appeared in recent months. The usual treatment with antiseptics was carried out.

February 12, 1932: two new styes were present on the right lids. Fomentations and antiseptics were used.

March 23, 1932: there was a mass of granulation tissue near the right upper punctum which hung down from the conjunctival surface. Some blepharitis was present and zinc drops were ordered.

March 29, 1932: two new styes appeared.

April 30, 1932: at the Hospital for Sick Children a chalazion was incised under general anæsthetic and the granuloma removed.

November, 1932: a new chalazion was present.

December, 1932: a mass of granulation tissue was seen on the right lower lid margin which remained red until August, 1933, and a new area of redness appeared at the outer margin of the lids.

November, 1933: after consultation, a series of staphylococcus toxoid injections was given. During the treatment a stye appeared on the left eye, but did not develop. The father was strongly against glasses, and it was not until September 13, 1934 that glasses were ordered, although a refraction had been done in 1932 and glasses advised.

December, 1934: the mother was afraid another stye was developing as the right lid margin was red, but the inflammation subsided when an aberrant lash which rubber the cornea was epilated. The child, now aged 6, with −1.00 cylinder had 6/9 vision in each eye and with both eyes saw part of the 6/5 line.

March, 1936: the right lid was red and another aberrant lash was epilated. No new styes had developed since the toxoid and the lids had been quiet.

Case 4

Miss C., January, 1933, aged 54, complained of having had several styes in the past few years and inflamed lid margins. After refraction glasses gave comfort until January 20, 1934, when a stye on the left lid was incised, yielding much pus which contained Gram-positive cocci.

In January and February, a series of 8 injections of staphylococcus toxoid 0.05, 0.1, 0.15, 0.2, 0.25, 0.3, 0.4, 0.5, 1 cc. was given. Moderate reaction followed the first injection, but the patient was not upset.

April 4, 1934: a red area appeared on the lid margin but did not develop. It was discovered that she had been using an eye cup regularly. This was forbidden.

May 14, 1934: moderate blepharitis was present and an aberrant lash was epilated.

September 4, 1936: another small red area appeared at the root of a lash, but did not form pus.

This patient had had frequent attacks of follicular conjunctivitis. She had a very fair delicate complexion and had always been troubled with what she called a family characteristic—red eye-lids. She herself suggested another series of toxoid which will be given if any further inflammation occurs.

The above cases are presented from private practice, as it has not been possible to obtain satisfactory follow-up visits from hospital patients.

Case 5

At the Toronto General Hospital, Mary E. was seen on December, 1933, suffering from the fourth stye in two months. She stated she had had 6 or 7 in the past year. A series of 4 staphylococcus toxoid injections were given following a microscopic finding of Gram-positive cocci from the incised stye.

Case 6

Violet R., aged 34, had suffered 9 styes in 6 months. A series of 7 staphylococcus toxoid injections were given between March 2, 1934 and April 20, 1934 at regular intervals, 0.05, 0.15, 0.2, 0.3, 0.2, 0.4. The patient was being treated in the surgical ward for a low intermittent fever, and she complained of ill health of long duration. On her discharge from the hospital her lids were clear and were still clear when she was readmitted in November, 1934, suffering again from a low intermittent fever.

Case 7

June 28, 1934: a consultation was requested for a patient, aged 38, suffering from the fifth stye within two years which had ruptured the previous day. The culture showed the presence of *S. aureus hæmolyticus*. Following a series of four toxoid injections his lids cleared and no further report of him has been registered.

We have long realized the need for a treatment that will develop a resistance to recurrent staphylococcus lid infections. This short series of chronic cases would indicate that staphylococcus toxoid does increase the resistance against this particular type of infection.

Discussion

Case 1 is probably the most impressive success. His severe reaction was caused by a strain that occurred in lot 4 which has since been eliminated. This lot was used in Case 2 where the glands in the groin became painfully enlarged. None of the other patients suffered serious reactions. Nor in three of the patients (Cases 2, 4 and 5), when a succeeding series of injections were given after an interval of months, did any severe reaction occur. Case 2 showed that staphylococcus skin infections were cured by the toxoid, and

the woman wished a second series, twenty months after the first, for her complexion. Case 3 shows the importance of glasses as an aid in dealing with a very protracted severe staphylococcus infection. His discouraged parents were worried, and two consultations resulted in no better method of treatment. The toxoid was a success, and the lids have remained clear, except for the occasional aberrant lash, a relic of the blepharitis and styes.

Patient 4 had suffered for over 40 years, visiting specialists in several countries, and she is firmly convinced that her family tendency to red lids, blepharitis and styes is held in check by the toxoid. A recurrent follicular conjunctivitis has not been helped; microscopic examination showed the pneumococcus to be the cause of this on at least one occasion, when seen early in an attack. Patient 5 had two series of injections and was definitely benefited, although the importance of hygienic care and refraction are shown as adjuncts to toxoid treatment. Sad to relate the "cure" is ascribed by the family to tin pills!

CONCLUSIONS

1. It has been shown experimentally that antitoxic immunity against staphylococcal infection may be increased five- to ten-fold by a series of toxoid injections. Clinically, it seems sufficient to prevent reinfection, while refraction and the usual treatment further insure the safety of the patient.

2. Clinically the protection seems to last from two and one-half to three years; laboratory experiments show that the protection, as judged by serum tests, falls about 50 per cent in one year.

3. When a family susceptibility to staphylococcus infection is present in fair people the toxoid should be used early in addition to general treatment.

Case Reports

A CASE OF INTRA-ABDOMINAL PREGNANCY

BY G. B. BIGELOW

Prince Albert, Sask.

Mrs. A.B., aged 26, was seen on November 6, 1937.

Complaint.—Pain in the left lower quadrant of the abdomen.

History.—About one week previously the patient began to have a dull ache in the left lower abdomen and this pain had been getting progressively worse from day to day. It was constantly present and was now a sharp burning ache. Her last normal menstrual period was on October 1st, but she bled for two days again on October 15th and again for a day on November 3rd. She had had no vomiting or nausea. There had been no urinary symptoms. Her previous history was irrelevant to present illness. She had had one child, three years ago; pregnancy, delivery and puerperium were normal.

Examination. — No abnormality except a slight, diffuse enlargement of the thyroid gland which she stated had been present since she was 12 or 14. There were no signs of toxicity from the goitre. The abdomen was soft and freely movable during respiration. Palpation discerned some slight tenderness deep down in the left lower quadrant, but no mass or other abnormality was to be felt. The cervix was somewhat enlarged and contained a small cyst on its vaginal aspect. There was a tender, soft mass in the left fornix close to the side of the uterus about the size of a golf ball. It was not movable. The uterus was not enlarged. Urinalysis, normal; white blood count, 12,900, with 75 per cent polymorphonuclears.

The patient was hospitalized and treated for pelvic inflammation with possible pyosalpinx by means of heat to abdomen, hot douches and sedatives. This treatment relieved the pain, but it returned the following day. On November 9th another vaginal examination was carried out. This revealed the mass in the fornix to have increased in size to that of an orange and to have become much more tender. The diagnosis was changed to tubal pregnancy and operation was decided on.

The patient was given gas and ether as the anæsthetic. On opening the abdomen a fair quantity of blood and blood clot was found in the pouch of Douglas. The left tube and ovary were slightly congested and the ovary contained several small cysts. Situated behind the broad ligament and up against the lower half of the left side of the uterus was a shaggy irregular surface covered with black, clotted blood and fleshy material. On removing the blood clot, the muscular walls of the uterus could be made out plainly and a depression of three-eighths of an inch deep and 2 inches in diameter left in the uterine wall. A slight oozing from this surface stopped with the application of hot sponges. The left tube and ovary were removed and a large rubber tube was inserted in the pouch of Douglas for drainage.

The patient was restless from the beginning and on the second day after operation her pulse began to climb. She complained of palpitation and shortness of breath. During the same night she became irrational and very restless, and on the third day became steadily worse. She died late in the afternoon of the third day from an acute thyroid crisis.

The operation incision was enlarged post-mortem, and the bladder, uterus and appendages removed for further study. Neither the tube removed at operation nor the right tube removed post-mortem showed any signs of rupture of an embryo through it, and neither broad ligament showed signs of any abnormality. There was a deep hole in the back of the left side of the uterus which was almost through to the inside of that organ.

Pathological report stated the finding of chorionic villi in the fleshy debris scraped from the uterine wall during the operation. The ovary contained multiple follicular cysts; a fibrosis and non-specific salpingitis were also noted. The pathologist was quite emphatic about the fact that a pregnancy in that tube could not have existed. This confirmed the diagnosis made at operation, namely, an intra-abdominal pregnancy engrafted on the outside of the uterus.

UTERUS DIDELPHYS

By N. E. Nykiforuk

St. Paul, Alta.

Mrs. J.P., aged 18, primipara, was first seen at the eighth month. A bimanual examination was thought advisable when she herself believed she had two vaginal openings and especially when she said that a sister of hers also had the same condition. The examination revealed a larger left vagina and a small right vagina which barely admitted one finger and at a depth of about two inches connected with the larger vagina by a small opening. A flat male type of pelvis was also noted.

At term, after a fair test of natural labour, episiotomy and mid-forceps were necessary. The baby was delivered alive but considerable compression probably contributed to its death after thirteen days. The double cervix was found only after I discovered the fundus to be over towards the right iliac fossa and was searching for the cervix in preparation for uterine packing for a moderate post-partum hæmorrhage. The right half of the uterus was pregnant and its cervix was easily accessible from the left vagina. The left cervix was normal and, of course, closed. The right vagina in this case seems to be of a vestigial nature.

As the baby weighed only six pounds it would seem that to get a live and healthy child it will be necessary to do a Cæsarean section for the next confinement, unless of course both halves of the uterus become pregnant at once, when other procedures may be necessary.

This case also brings up the question of hereditary influence in these congenital conditions. The patient's sister, by the way, had only a double vagina and was delivered this summer at another hospital, with no known complications.

CÆSAREAN SECTION FOR PLACENTA PRÆVIA

By H. A. Hamman

Fort Vermilion, Alta.

Mrs. T., aged 33, was first seen at the termination of her fifth pregnancy in the early morning of August 11, 1937, having been in labour five hours. She was deathly white and lying in a pool of blood.

Examination revealed the os patent to one finger and the presence of placenta prævia. An immediate effort was made to quicken dilatation, as it was hoped that a version could be effected and a foot brought down. Efforts to accomplish a version failed and the frequent pains and copious hæmorrhage were so weakening that signs of dehydration were beginning to show about the eyes.

The patient was bundled into a car and brought to hospital, where immediate preparations went forward to place her on the operating table. At 9.00 a.m. she was taken to the surgery. Anæsthesia was induced by myself, using chloroform in ether and later switching to ether by the open method. As soon as anæsthesia passed from the first stage it was turned over to the Sister, and I prepared for the operation. The patient's pulse was 130, so all possible haste was made in order to deliver her. The assistants were the one Sister and two untrained nuns.

Incision was made down the mid-line from about three inches above the umbilicus to a point about three inches below that point, over the most prominent part. Once through the abdominal wall a similar incision was carried into the uterus. No time was spent in catching bleeders here, and the cavity was speedily reached, the baby's feet grasped, and the head eased out of the pelvis. A little difficulty was experienced in this manœuvre. The cord was severed and tied, the baby was handed over to another nun, who was asked to attempt resuscitation as the infant was not making any effort to breathe. It was removed from the room. The placenta was manually removed from the lower part of the uterine wall and the excess blood sponged out. Deep sutures were then placed in the uterine musculature and firm closure effected. Muscular contraction had stopped the bleeding. At this point the patient showed signs of distress, the pupils being dilated, so anæsthesia was stopped, an ampoule of coramine given hypodermically, while closure of the abdominal wall went forward. Pads and a firm binder applied, and the patient was given 0.5 c.c. of pituitrin.

At 12.00 noon she was conscious; the pulse was strong, rate 76; no vomiting. A saline was begun as soon as patient placed in bed and its effect was also manifest in the pulse showing better volume. At 3.00 p.m. the pulse was 84. Coramine was again administered and at 4.00 p.m. 0.5 c.c. of pituitrin again. At 4.30 p.m. the patient complained of headache and distress so codein, gr. 1/6, was ordered. The temperature at this time was 98.4° F. Sips of iced ginger ale were allowed. At 10.00 p.m. another hypodermic was given for sedation and patient spent a fair night.

Her post-operative course was most satisfactory, considering what she had been through. There were some headache and fever, due probably to the development of a stitch abscess and an infected tooth, but these were not serious. She was up in a chair on August 25th, and was discharged perfectly well on September 2nd. The baby did well, and is gaining weight steadily.

TRAFFIC ACCIDENTS AND ALCOHOL.—H. S. Nissen-Lie has investigated the conditions under which traffic accidents occurred in Oslo in the two months from November 20, 1936, to January 20, 1937, with special reference to the alcohol found in the blood of 160 persons brought to a first-aid station. Apart from the six persons coming to the station more than twenty-four hours after injury, there were fifty male and twenty-five female pedestrians, twenty-four children under the age of 14, twenty-five passengers, twenty cycling messenger boys, and ten motor car drivers. None of the cycling boys seemed under the influence of alcohol, and only two of the twenty-five female pedestrians showed definite signs of alcohol poisoning. Analyses of the alcohol content of the blood of thirty-three of the fifty male pedestrians showed that all but five were under the influence of alcohol, the concentration of which in the blood of these five cases was under 60 mg. per 100 ml. The lowest figure among the analyses rated as positive was 123 mg. per 100 ml., and the highest was 350 mg. per 100 ml. In as many as fifteen cases the figures were between 200 and 300 mg. per 100 ml., and only in eight cases did the analysis show more than 300 mg. per 100 ml. This study suggests that considerably more than half of the adult male pedestrians who are victims of traffic accidents in the streets of Oslo are under the influence of alcohol at the time. The author concludes that most traffic casualties belong to one or other of three groups—namely, children, drunken adult males, and cycling messenger boys.—*Tidsskr. norske Lægeforen.*, August 1, 1937, p. 799. Abs. in Brit. M. J.

Therapeutics and Pharmacology

NOTES ON POST-OPERATIVE VOMITING

BY H. O. FOUCAR

Chief of Surgery, St. Joseph's Hospital, London, Ont.

In considering this sign it is well to review the types seen, for here lies the clue to the treatment.

Moderate vomiting may be present during the first day and does not require special care. After that time, however, this occurrence should not be dismissed too casually. A mild toxæmia due to dehydration may cause vomiting, which subsides when the fluid balance is restored. Nervousness is a common cause and may result in extreme anorexia nervosa. In this group sedatives are essential. The stomach should be washed out, to exclude retention. Fluids must be given by other channels to ward off dehydration in this as in all other groups.

The vomiting of acidosis is less prevalent now since it is no longer considered necessary to purge and starve a patient. Fluids, glucose and alkalies relieve this situation. More important, however, is the vomiting of alkalosis because it is often confused with the former, and alkalies are given to the patient's undoing. For want of a better one, the term "high intestinal intoxication" has been applied to this type. With continued vomiting hydrochloric acid is lost and the blood chlorides are depleted. This sets up a vicious circle, which, if not broken, spells disaster. The treatment is simple and the results spectacular. Saline solution given intravenously changes the outlook promptly.

Vomiting due to varying degrees of retention is relieved by lavage. Hyper-secretion seems to be a factor in some cases. A small indwelling tube is probably easier here, for the patient may then relieve himself at will by aspiration. Sometimes the pressure is sufficient to push out the plunger of the syringe without the use of suction.

Acute gastric dilatation must be recognized promptly or a fatality results. The patient is in urgent need of gastric lavage, continued as long as the condition lasts. Because it is thought that the superior mesenteric vessels exert pressure on the duodenum the patient should be turned on to his face, thus relieving the obstruction by allowing the vessels to fall away from the duodenum.

Another interesting type is that due to late retention. It may be observed about the seventh to the tenth day, especially after gastroenterostomy. Here apparently the gastric tone is not sufficient to cope with the increasing diet. Liquids pass through the stoma and the patient is comfortable. As the diet is increased retention takes place and the patient complains of a feeling of fullness or of weight. He does not relish his meals and may even regurgitate some food. If this entity is not recognized the patient finally refuses to eat and begins to vomit undigested food. In one case the stomach contained 3,000 c.c. Lavage early, to keep the stomach empty and so allow it to regain its tone, followed by frequent small feedings, and then a return to a regular diet, remedies the condition.

Vomiting due to mechanical obstruction should be rare, if care has been used in the operative procedure. It is diagnosed by excluding the other types, and its treatment consists of exploration and correction of the underlying factor.

Finally there is the vomiting of paralytic ileus. Pitressin, spinal anæsthesia and hypertonic saline intravenously have been suggested. Others recommend that purgatives and enemata be eliminated, that the patient be given nothing by mouth but that large quantities of normal saline solution be given intravenously by the continuous drip method. "Intestinal decompression", or the use of an indwelling tube in the stomach or duodenum with suction applied, is preferable to enterostomy.

It can readily be seen then that the vomiting due to toxæmia, nervousness and to disturbed metabolism can usually be prevented by proper management. The importance of gastric lavage, of maintaining the fluid balance, and of preventing the depletion of blood chlorides is also evident.

THE TREATMENT OF INFECTED WOUNDS WITH GLYCERINE

BY O. A. CANNON AND H. T. EWART

The Steel Company of Canada, Ltd., Hamilton, Ont.

The treatment of infected wounds with glycerine packing is carried out in several institutions but is not in general use. We have been using glycerine wherever opportunity has been afforded for the past six months and find that it is a very effective and simple treatment. Of our group of cases, we wish to briefly report three.

R.C. Was treated for an infected hand by the usual conservative methods for five weeks without improvement. During this time the hand was incised twice. At the end of this time a third incision was made and the wound tightly packed with glycerine gauze. Healing was rapid and in two weeks the wound was clean and closing satisfactorily.

B.W. A large ischio-rectal abscess was incised and packed with gauze soaked in glycerine. The infection cleared quickly but daily packing was continued until the cavity filled in. This took about two weeks. Subsequent examination showed healing complete with a minimum degree of induration.

R.E. Patient complained of soreness in his right axilla which slowly developed into a suppurative lymphadenitis. He gave a history of a similar attack some 10 years previously, when he lost about two months' work. In due course the abscess was incised and a large amount of pus evacuated. The cavity was packed daily with gauze soaked in glycerine and was practically obliterated after eleven days. Seventeen days after incision the patient returned to light work.

The technique used is very simple. The area is first cleaned well with alcohol. A sterile gauze bandage is soaked in glycerine and the infected wound packed tightly. Glycerine is then poured over the loose end and covered entirely by a dry dressing. Packing is carried out daily as the hygroscopic action of the glycerine has then been almost exhausted. There is very little pain involved in packing and none on removal of the gauze.

From the results obtained, we feel that this treatment, due to its simplicity and effectiveness, is worthy of more widespread use.

Clinical and Laboratory Notes

ERYSIPELAS: A PRACTICAL METHOD OF TREATMENT THAT WORKS

By R. E. HOLMES

Windsor, Ont.

Erysipelas, a disease of antiquity, still carries an antique name—the English translation of the Greek "red-skin", "St. Anthony's Fire". As with numerous skin conditions, its title describes a physical appearance rather than the pathological basis. While the name has not changed with the centuries, the treatment has. There were the days of Liq. Ferri Perchlor, XX t.i.d., followed by the custom of using ichthyol in aqueous solution 20 per cent, as an ointment or 3 i ichthyol to ℥ i. Now erysipelas antitoxin is used. The results depend upon the specificity of the preparation used for the particular strain of streptococci causing the infection.

For the past fifteen years the writer has used nothing but the ultra-violet ray, and has never needed more than five treatments. The dosage is heavy, 15 to 30 minutes the first treatment, at a distance of 24 inches. The patient will experience a sense of relief within three or four hours. Daily exposures are given for the next three or four days. In treating erysipelas of the face no protection for the eyes is required other than having the patient keep the eyelids closed tightly.

A NEW DIAGNOSTIC INTRADERMAL REACTION WITH BOWEL ANTIGEN: INDICATING THE PRESENCE OF VIRUS OF VENEREAL LYMPHOGRANULOMA IN INTESTINE AND DIFFERENTIATING COLITIS ASSOCIATED WITH THAT VIRUS.

Moses Paulson, with the technical assistance of Betty Kravetz, reports a new technique making possible the practical preparation of bowel antigen and the results of studies with additional bowel antigens, including necessary control studies. The following data establish, it is believed, a practical intradermal diagnostic method with bowel antigen to indicate the presence of the virus of venereal lymphogranuloma or an associated product in the human intestine, as well as a means of differentiating colitis associated with the virus of venereal lymphogranuloma. Intradermal reactions with the antigens were tested in four types of cases—those presenting positive and those presenting negative Frei reactions, with and without colitis. To avoid confusion in designation and to distinguish the bowel antigen and its intradermal response from the Frei antigen and its reaction, the following terminology is suggested: An antigen prepared from bowel material or tissue and its intradermal reactions should be termed "bowel antigen" and "positive (or negative) intradermal reaction to bowel antigen," respectively. A positive response to the antigen indicates the presence of the virus of venereal lymphogranuloma in the material from which the antigen was made. While the indication of the presence of the virus of venereal lymphogranuloma in the intestine is not proof of etiology of the colitis which it accompanies, experimental and clinical evidence strongly suggests this relationship. Criteria for interpretation of the intradermal tests have been developed. By tests with this antigen it is hoped to narrow further the classification of non-specific ulcerative colitis. the cases in which there are indications of the virus of venereal lymphogranuloma in the intestine being separated from those in which there are not, suggesting differences in clinical approach. —*J. Am. M. Ass.*, 1937, 109: 1880.

SHORT-WAVE DIATHERMY IN WHOOPING-COUGH.—K. R. v. Roques reports 49 cases of whooping-cough cured by means of short-wave diathermy. Both chest and neck were treated at each sitting, each for about ten minutes. All the cases were cured. The average duration of the treatment was about a fortnight. Recurrences were treated in the same way. Medicinal treatment was carried out in addition whenever necessary.—*Med. Welt*, September 4, 1937, p. 1240. Abs. in *Brit. M. J.*

Editorial

ACUTE APPENDICEAL OBSTRUCTION

IN the present number the *Journal* publishes an article by Dr. E. H. Wood, under the title of "Acute Intestinal Obstruction—Appendiceal". The general tenor of Dr. Wood's thesis is to support the views of Sir David Wilkie concerning a more precise diagnosis in cases of "appendicitis", views which are now generally known. Wilkie's first article on the subject appeared in 1914, since when he has published several other contributions to the same subject.

The essential points that Sir David has made are that, first, there exists a pathological condition, ordinarily called appendicitis, which is primarily nothing more than an acute obstruction of the appendix; a condition which may give rise to secondary inflammation of the organ or not, largely according to the amount of fæces retained in the appendix behind the obstruction. Secondly, that this form must be clearly distinguished from the ordinary form of primary acute appendicitis; and, thirdly, that the essential difference between the two forms lies in the fact that pure obstruction does not give rise to fever or elevation of pulse rate during the first few hours of the attack, whereas primary appendicitis does do so. The importance of making the diagnosis between the two forms lies, as Wilkie emphasizes, in this; that the practitioner, finding pulse and temperature practically normal, may be induced to wait for changes in these respects before deciding that operation is necessary, while all the time the primary obstruction may be giving rise to "fermentative" changes in the obstructed portion, which may go on shortly to perforation. His rule, therefore, is to ignore the state of the temperature and pulse rate in the early stages, and base the diagnosis entirely on the facies and the local examination of the abdomen.

Dr. Wood, who apparently is a stout supporter of Sir David's teaching, gives us in this article the result of a questionnaire, which he addressed to nine medical schools in Canada, the United States, and Great Britain. The answers received must be read in the original. The important point for us is that Dr. Wood finds that Wilkie's teaching is not accepted and is not being given to students in Canada, and he feels that this is a pity and that Wilkie's "remarkable contribution is not bearing the fruit it deserves".

There is no doubt that Wilkie's observations confirm impressions, indeed opinions, already formed by a great many surgeons, to the effect that obstruction of the lumen is extremely apt to provoke acute inflammation in the distal portion of the appendix, and Dr. Wood's article calls particular attention to this fact, but it may legitimately be doubted whether the somewhat hard and fast rules of Wilkie's teaching are either, in many instances, correct, or that his pathological observations offer a sound basis for these rules. The mere absence of fever and rise of pulse rate during the first few hours cannot always be accepted as evidence that the condition is purely obstructive and that infection is absent. Moreover, in our experience, a definite colicky pain, accepted by Wilkie as one of the chief points in the diagnosis of appendicular obstruction, is rarely complained of at the onset. There are too many exceptions to these rules to make them valid for judgment; yet they have their value as confirming the one generalization upon which most surgeons are agreed—that, for safety's sake, an acute onset of pain which can be diagnosed as being due to some disturbance in the appendix calls for operation as an emergency, regardless of the state of the pulse and temperature.

In general, we agree with the opinion from Scotland, as given in Dr. Wood's paper, and the final sentence of that opinion constitutes the justification for Wilkie's teaching, and represents perhaps the most valuable point in the paper. Nevertheless, Dr. Wood's contention that the Canadian schools are derelict in that they apparently do not formally instruct their students in Wilkie's

teaching is hardly justified. It is possible that Canadian schools are not "against" this teaching, but rather lay a general emphasis upon the danger of delay in any case of appendicitis because of possible pathological conditions involving danger (including the primary obstructive type), while at the same time disagreeing with the correctness of the view that there exist clinical indications definitely pathognomonic of the primary obstructive type.

In spite of these theoretical considerations Dr. Wood's article is to be commended in that it brings to the mind of the general practitioner the possibility of the primary obstructive type, and the particular danger of delay when this type is suspected to be present. This is true even if one is inclined to disagree with his explanation of the pathological changes occurring in "closed" appendicitis, and to regret his lack of emphasis upon the quite clear symptoms suggestive of the onset of gangrene. Comparatively few obstructed appendices go on to gangrene and perforation, although gangrene is the particular danger that is to be feared when obstruction does occur. The important point, therefore, seems to us to be to educate the practitioner, first, in the idea that obstruction may have occurred, and in the attempt to diagnose that condition early, but, secondly, also, in the interpretation of the actual signs and symptoms of gangrene and threatening perforation in such cases as are seen by the practitioner comparatively late. The symptoms of gangrene, when already constituted, are, briefly, subsidence of the initial acute pain without coincident fall in temperature and pulse rate, rather with a rise in the pulse rate, fever being uncertain. This lack of correlation between pain and pulse rate demands immediate operation.

EDWARD ARCHIBALD.

PHYSICIANS' RESPONSIBILITY FOR NORMAL NUTRITION

NO science has made greater advances during the past twenty-five years than that of human nutrition. Before 1912 the physician's main concern was to see that his patient received a proper supply of fats, carbohydrates and proteins; very little was known of the importance of the minerals, and the word "vitamin" was then unknown. Now we know that of the twenty-two amino acids commonly present in protein, ten are essential, and life could not exist without twelve minerals and at least six vitamins.

In the past the goal of the physician and public health worker has been to see that the population enjoyed average health and did not suffer from under-nutrition, or marked malnutrition. Recent observations on animals[1] show that, starting with a diet already considered adequate, the feeding of additional amounts of certain food elements increases the rate of growth of the animals, maintains their youthful appearance longer, and lengthens their span of life. Carefully conducted studies in Canada have indicated that our present dietary customs may result in many persons not receiving amounts of some of the food elements commensurate with the highest attainable level of health. Unfortunately, the practical application of facts concerning nutrition has not kept pace with our increasing knowledge. The practising physician is so absorbed with the problem of diagnosis and treatment of disease that frequently the question of diet is more or less pushed into the background. The physicians of Canada must increase their interest in this problem of normal nutrition, otherwise the public will seek information on this subject elsewhere.

The Canadian Medical Association has long been interested in this subject, and this interest has crystallized in the formation of a Committee on Nutrition. With a view of presenting very briefly and in a practical manner proved facts concerning what the normal person should eat, and the reasons why, the Committee is obtaining for the *Journal* a series of short, practical, authoritative articles on normal nutrition, which will appear each month during the coming year. This is being done in the belief that the physician can apply these

1. SHERMAN, H. C. AND CAMPBELL, H. L.: Nutritional well-being and length of life influenced by different enrichments of an already adequate diet, *J. of Nutrition*, 1937, **14**: 609.

facts with benefit to every patient who consults him for any cause.

Further, in order to bring to the attention of the public the importance of nutrition in relation to health, the Committee is arranging a series of addresses to be given across Canada by outstanding scientists of this continent and Great Britain. These addresses will also be of interest to the medical profession. The first address will be given in Ottawa, our capital city, and broadcast across Canada, on the evening of Saturday, February 19th, by E. V. McCollum, M.A., Ph.D., Sc.D., Professor of Biochemistry, Johns Hopkins University, one of the outstanding nutritional workers on this continent. Professor McCollum will give an address in Winnipeg the following week, and at intervals during the year other speakers will be heard in various centres throughout Canada.

It is hoped that the efforts of the Committee will result in a more general application of our present knowledge of normal nutrition by the physician in his every day practice. This, combined with an increased interest of the lay public in the subject of nutrition and a desire on their part to obtain authoritative information free from fads and fallacies, will result in a higher level of health for the Canadian people.

F. F. TISDALL AND T. G. H. DRAKE.

Editorial Comments

Canadian Broadcasting Regulations

The Canadian Medical Association has always been interested in the character of the programs coming over the radio — in particular those advertising drugs, proprietary preparations, medical treatments, and concerning matters bearing upon Public Health. It is obvious that the radio affords an ideal medium for the propagation of fads, fancies, and "information" of an undesirable and even dangerous character. Truths, half truths, and whole lies may come over, to the possible detriment of the listening public, who in many cases are not in a position to assess the value of the statements they hear. Hence the importance of the regulation of radio broadcasts. We welcome, therefore, "Regulations for Broadcasting Stations made under the Canadian Broadcasting Act, 1936, Chapter 24, I Ed. VIII, S. 22", a copy of which reached us a short time ago through the courtesy of Major Gladstone Murray. These regulations seem to us very satisfactory, inasmuch as, even though the subjects we have mentioned are not dealt with in minute detail, the powers conferred on the Canadian Broadcasting Commission seem to be ample for the satisfactory control of the situation. We quote certain portions which will have a special interest for medical readers. The Foreword states "These regulations are designed to maintain and improve the standard of broadcasting in Canada".

In regard to policy the Corporation sets forth its principles thus. "It is not the intention of the Corporation to restrict the freedom of speech nor the fair presentation of controversial material. On the contrary, the policy of the Corporation is to encourage the fair presentation of controversial questions. At the same time, it should be realized that the message of broadcasting is received at the fireside in the relatively unguarded atmosphere of the home, reaching old and young alike. Certain subjects, while meriting discussion elsewhere in the public interest, are not necessarily suitable for this intimate medium."

Section 7 reads as follows.

No one shall broadcast

(a) Anything contrary to law;

(b) The actual proceeding at any trial in a Canadian Court;

(c) Abusive comment on any race, religion or creed;

(d) Obscene, indecent or profane language;

(e) Malicious, scandalous, or defamatory matter;

(f) Advertising matter containing false or deceptive statements;

(g) False or misleading news;

(h) Upon the subject of birth control;

(i) Upon the subject of venereal disease, or other subjects relating to public health which the Corporation may from time to time designate, unless such subjects be presented in a manner and at a time approved by the General Manager as appropriate to the medium of broadcasting;

(j) (i) Programs presenting a person who claims supernatural or psychic powers, of a fortune-teller, character analyst, crystal-gazer or the like, or programs which lead or may lead the listening public to believe that the person presented claims to possess or possesses supernatural or psychic powers or is or claims to be a fortune-teller, character analyst, crystal-gazer or the like.

(ii) Programs in which a person answers or solves or purports to answer or solve questions of problems submitted by listeners or members of the public unless such programs prior to being broadcast shall have been approved in writing by a representative of the Corporation.

Section II (i) In any program no one shall advertise

(e) Spirituous liquors;

(f) Wine and beer in any province of Canada wherein the provincial law prohibits the direct advertisement of wine and beer, nor in any other province unless immediately prior to the coming in force of these Regulations wine and beer have in fact been directly advertised in such province through the facilities of radio.

There are other special regulations applying to this matter.

Section 13 reads.

1. No continuity advertising an article marketed under the Proprietary or Patent Medicine Act or the Food and Drugs Act may be broadcast until it has been approved by the Department of Pensions and National Health. Continuities submitted for approval shall be forwarded, in duplicate, to the Canadian Broadcasting Corporation, Ottawa, at least two weeks in advance of intended use. The formula for any article bearing a distinctive or trade name distinguishing it from any other product, and marketed under the Food and Drugs Act, shall be submitted with each pertinent continuity.

2. No electrical transcription advertising an article marketed under the Proprietary or Patent Medicine Act or the Food and Drugs Act shall be broadcast by any station unless certified by an affidavit that the advertising continuity has been approved by the Department of Pensions and National Health.

3. No announcer may broadcast any statement concerning any article marketed under the Food and Drugs Act or the Proprietary or Patent Medicine Act that is not contained in the continuity approved by the Department of Pensions and National Health.

4. Testimonials referring to an article marketed under the Food and Drugs Act or the Proprietary or Patent Medicine Act shall be regarded as constituting part of the advertising continuity.

5. No continuity recommending any treatment for any ailment shall be broadcast until it has been approved by the Department of Pensions and National Health.

6. Inspectors of Food and Drugs, Department of Pensions and National Health, are authorized to act as representatives of the Corporation for the purpose of enforcing this regulation.

Thus it would seem that the Canadian Broadcasting Corporation has ample powers to deal with the abuses we have in mind. Where our Association has any fault to find or comment to make, then, it should make representations to the central authority at Ottawa, where, we believe, our views will receive careful consideration.

An appreciative editorial in the issue of the *Journal of the American Medical Association* for November 6, 1937, concludes as follows: "Thus we shall receive from our northern neighbour radio broadcasts of purity in contradistinction to the quackery, fortune teller and 'patent medicine' promotion that comes floating like a foul effluvium across the Rio Grande. The new Canadian broadcasting regulations may also serve as a suggestion much needed by our own broadcasting chains." A.G.N.

The Late Lawrason Brown, B.A., M.D., D.Sc.

We regret to have to announce the death, on December 26, 1937, of Dr. Lawrason Brown, of Saranac Lake, N.Y. For years he was Resident Physician in charge of Trudeau Sanatorium and did much by his personal research to enhance its steadily growing reputation. Brown's name was a household word in America among those who have devoted themselves to the study of tuberculosis.

Doctor Brown was a graduate of Johns Hopkins University, taking his B.A. degree in 1895 and his M.D. in 1900. In the latter year he became assistant resident physician to the Trudeau Sanatorium, in 1901, resident physician, in 1912, visiting physician, and eventually consulting physician. From 1916 onward he was an instructor in the Trudeau School of Tuberculosis (in the establishment of which he took the leading part), a training school for physicians started in 1916 under the Edward I. Trudeau Foundation. He was a member of the board of trustees of the Trudeau Sanatorium and several other institutions, and was on the advisory council of the Henry Phipps Institute of the University of Pennsylvania. He had been, at various times, president of the American Clinical and Climatological Associations, the American Sanatorium Association, and the National Tuberculosis Association. He was a Fellow of the American College of Physicians, and a member of the Association of American Physicians, the American Association of Thoracic Surgery, the American Association for the Advancement of Science, and the American Public Health Association. The National Tuberculosis Association awarded him the Trudeau Medal in 1933 in recognition of his distinguished work in the study of tuberculosis. He received the honorary degree of D.Sc. from two colleges, Dartmouth, in 1931, and the Medical College of Virginia, in 1936.

Doctor Brown wrote much on his chosen specialty, usually from the diagnostic, therapeutic and public health side, but he also did good work of a research character. He investigated the tubercle bacillus itself, the place of tuberculin in diagnosis and treatment, and the question of complement fixation in tuberculosis. He was one of the pioneers in the application of the roentgen ray to early diagnosis.

He was also the author of "Rules for Recovery from Tuberculosis", "Intestinal Tuberculosis" (with H. L. Sampson), and "The Lung and Tuberculosis" (with F. H. Heise). He contributed articles to Osler and Macrae's "Modern Medicine", Tice's "Practice of Medicine", Klebs' "Tuberculosis", Cecil's "Textbook of Medicine", and Blumer's "Therapeusis of Internal Diseases". A.G.N.

Men and Books

A FEW ANATOMICAL NAMES

By W. A. McFALL, *Toronto*

Names are always interesting and anatomical ones are especially so. When men of the ancient civilizations wished to attach a name to an organ or structure of the body they sought out some familiar object—something in the world of nature which had to it a resemblance in form, outline, or supposed function, and thus a name was created. Daily we use these terms, but are many times forgetful of their meaning and origin. For example, the familiar name *conjunctiva* is used for the outer membrane of the eye. Now "conjunctiva" means "conjunction". What does the membrane conjoin? The conjunctiva by its extension and continuity through the lachrymal duct connects the eye with the nose. With the meaning of the name kept in mind, we at once appreciate why our patients frequently develop a conjunctivitis subsequent to a disturbance of the nasal passages.

When the ancients looked at the first cervical vertebra with the head resting on its shoulders, they thought of the mythological figure who carried the world upon his back and so the vertebra was named *Atlas.* But when they looked at the distal extremity of the spinal column with its curved end they were reminded of the beak of the cuckoo, and so that portion of the anatomy was named *coccyx,* which means cuckoo. But another bird was thought of when a process of the scapula was to be designated, and so the process was named *coracoid,* which means "like a crow". Even the despised goat was not overlooked. When the wise men looked just within the outer ear they saw a small eminence from which was growing a tuft of hair, and thus it was called the τράγος, which is the Greek word for goat. It is interesting to note that this word is related to our English words, "tragic" and "tragedy"—tragedy meaning "song of the goat". The thin middle covering of the brain with its thread and strands had the appearance to them of a spider's web, and so it was called *arachnoid* which means "like a cobweb". Very strangely, the bone projecting out behind the ear reminded them of the breast and the nipple of the breast, and for this reason it received the name *mastoid,* which word is cognate with the words "mastitis" and "mastodynia". But when the wise men looked at the pelvic bone, they were puzzled; nothing in the earth, air or sky had any resemblance to it and so it received the unique title of *os innominatum,* or "the bone without a name". The fossa of the pelvic bone in which the head of the femur reposes was, however, not so difficult to name. In shape it looked like a vinegar cruet and so received the title *acetabulum,* which word is cognate with the words "acetic acid" and "acetate". "Tonsil" has the vague meaning of a "sharp stake". The other name for the same gland is *amygdalum,* which is very apt as it means "an almond"; the old textbooks on the practice of medicine always gave "amygdalitis" as a synonym for "tonsillitis". "Œsophagus" means "a carrier of food". Stomach is derived from *stoma,* and means "a little mouth". Why little? Probably in the sense of secondary. *Pylorus* is from a Greek word which means "gate-keeper" or "warder". It opens and closes the gate when necessity demands. *Sphincter* means "shut tight". *Duodenum,* as is well known, is the Latin word for twelve. It does not mean, as commonly expressed, twelve inches but twelve finger-breadths, which makes the duodenum eight to ten inches in length (Gray). One modern writer states that the first four measures are the field of the surgeon; the middle four the domain of the physician; and the last four belong to the patient.

Jejunum means "empty", and is so called because that portion of the gut is frequently found empty. In English we have a related word "jejune", which means void of material or substance, and is sometimes used in reference to medical papers or political speeches, especially those of the opposing party! *Ileum* means "turned or twisted", and is thus well named. *Colon* means the largest intestine. "Sigmoid flexure" derives its name from its resemblance in outline to the Greek letter *sigma.* In anatomy other Greek letters are honoured, as in the names "deltoid" muscle and "lambdoidal" suture. *Rectum* means "straight", but it is not quite so straight as its name indicates. "Testicle" means a small witness or testament; it testifies to the individual's sex. The other name for the same organs is *didymi,* which means a pair, or twins. When Scripture refers to Thomas named Didymus it no doubt indicates that he was a twin. The term *epididymis* and *epididymitis* used in reference to the adjoined gland and an inflammation of it are the almost exclusive terms applied, but *didymitis* is rarely used and in its place we have the word *orchitis,* Greek in origin. *Uterus* is of uncertain origin, and simply means "womb". An inflammation of the uterus is described by the term *metritis,* which is derived from "metre", a measure —the womb, by its periodical menstrual flow, is a measurer of time. When the surgeon removes the uterus, he employs the term *hysterectomy.* This word is of interest in that it is related to "hysteria". The syndrome known as hysteria

was supposed to be caused by a disturbance of the uterus. The conclusion of the ancients may have been right. "Fallopian tube" is named for Fallopius, the great Italian anatomist of the 16th century. "Ovary" is derived from *ovum*, which means "an egg". The word "gland" is derived from the Latin *glandula*, a diminutive of *glans*, an acorn, from a fancied resemblance of certain of these structures to an acorn. If a gland resembles a bunch of grapes, it is called a "racemose" gland. The thymus gland is so called because of its resemblance to a bunch of thyme. The pancreas derives its name from its appearance, *pancreas* meaning "all flesh". The word "liver" is of doubtful origin, but it is generally agreed that the Anglo-Saxon word *lifer*, German *leber*, Icelandic *lifr*, Scandinavian *lever*, come from the same root as English "life", German *leber*, possibly meaning the liver as "the seat of life". The Greek word for "liver" was ἧπαρ. The Greeks however were not interested in the anatomy and histology of the liver; they viewed it psychologically, believing it to be the seat of two great emotions—love and anger. They doubtless had observed the relation between a man's outlook upon life in general and the state and functioning of his liver. The Romans in their scientific works simply transcribed the word ἧπαρ (genitive, ἥπατος) it becoming the familiar Latin word *hepatica*. The word for "liver" in common use among the Romans was *jecur*. In process of time it became the custom to feed animals figs in order to produce for eating large and sweet livers. Thus the liver became known as *jecur ficatum*, or the liver of an animal fed upon figs. After a time, the word jecur was dropped and the liver was known simply as *ficatum*. The Italian word for liver is *fegato*. In the case of the French, *ficatum* was contracted to *foie*, as in "paté-de-foie-gras", and "*huile-de-foie-de-morue*". Thus we have the interesting fact that in the Latin countries the word for liver is not derived from the organ itself but from the sweet and toothsome fig.

In English we call the smallest finger of the hand simply the "little finger", but the French call it *auriculaire* because of the custom of using it to poke the ear. Watch a body of men at the close of a tiresome meeting, and observe how apt is this name. While the English call the first finger "thumb", because it is thick, the French call it *pouce*, which means an inch. This arose from householders using as a measuring rod the distal phalanx which has an approximate length of one inch. The words "phalanx" and "phalanges" reflect the military genius of the Greeks. The digits, with their rows of bones, reminded them of an army in battle array. Thus, when we hold up our hand before our face we can view a solid phalanx. Very interesting in origin is the word "muscle". The creeping motion of a muscle under the skin had the appearance of a mouse crawling, and thus the word is derived from the Latin *musculus*, a little mouse. That same creeping motion was the basis of the good old nursery rhyme "One little mouse runs up the arm, two little mice run up the arm, etc." The longest muscle of the body has the clever title of *sartorius*, from *sartor*, a tailor, who in assuming his characteristic pose does so by the aid of the sartorius muscle. The muscles attached to the chin are named *genio*, as *genioglossus, geniohyoideus*, etc. *Genio* is derived from the Latin *gena*, meaning chin. Our English word genial is also derived from the same Latin word. We display our geniality by our chin. The two great muscles *gastrocnemius* and *soleus* unite, and are extended into the *tendo Achillis* which is attached to the *os calcis*. *Gastrocnemius* is from *gaster*—belly; it gives the belly form to the calf of the leg. Soleus derives its name because it is the shape of the sole (fish). Achilles, the ancient Greek, was armed to the teeth and almost invincible, but he was vulnerable in one place, the heel. *Calcis* means "a spur". The dome of the skull is known as *calvarium* which is interesting in relation to the word "calvary". The bottom of the foot is known as the sole because it is flat. Thus we have proceeded from soul to sole with many intermissions which can be completed at another time.

Association Notes

CANADIAN MEDICAL ASSOCIATION ANNUAL MEETING, HALIFAX, N.S., JUNE, 1938

LOCAL COMMITTEES

Honorary Local Secretary—DR. C. M. BETHUNE.

COMMITTEE ON LOCAL ARRANGEMENTS

General Chairman.—DR. H. K. MCDONALD.

Secretary.—DR. C. M. BETHUNE.

Members.—Drs. J. R. Corston, W. L. Muir, H. G. Grant, G. H. Murphy, H. W. Schwartz, H. L. Scammell, M. G. Burris, A. G. McLeod, C. E. Kinley, P. A. McDonald, R. P. Smith, F. G. Mack, E. K. McLellan, G. Wiswell, J. V. Graham, S. R. Johnson, J. G. MacDougall, F. R. Little, N. H. Gosse, D. J. MacKenzie, A. R. Morton, W. A. Curry, M. J. Carney, C. S. Morton, C. W. Holland, Hon. F. R. Davis, R. E. Mathers, J. W. Merritt.

ENTERTAINMENT COMMITTEE

Chairman.—DR. F. R. LITTLE.

Secretary.—DR. K. M. GRANT.

Members.—Drs. G. R. Burns, J. V. Graham, H. D. Hebb, G. L. Covert, W. D. Forrest, J. A.

Noble, G. LeBrun, J. R. Corston, H. D. O'Brien, A. McD. Morton, A. E. Murray, E. F. Ross, H. A. Payzant.

PROGRAM COMMITTEE

Chairman.—DR. H. W. SCHWARTZ.
Secretary.—DR. G. A. WINFIELD.

CHAIRMEN OF GENERAL SESSIONS

DRS. J. G. MACDOUGALL, G. H. MURPHY, W. A. CURRY.

SECTION OF MEDICINE

Chairman.—Dr. M. J. Carney.
Secretary.—Dr. J. W. Reid.

SECTION OF SURGERY

Chairman.—Dr. C. E. Kinley.
Secretary.—Dr. V. O. Mader.

SECTION OF RADIOLOGY

Chairman.—Dr. S. R. Johnson.
Secretary.—Dr. C. M. Jones.

SECTION OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY

Chairman.—Dr. R. E. Mathers.
Secretary.—Dr. R. H. Stoddard.

SECTION OF OBSTETRICS AND GYNÆCOLOGY

Chairman.—Dr. E. K. McLellan.
Secretary.—Dr. W. G. Colwell.

SECTION OF UROLOGY

Chairman.—Dr. F. G. Mack.
Secretary.—Dr. G. A. Winfield.

SECTION OF PÆDIATRICS

Chairman.—Dr. G. Wiswell.
Secretary.—Dr. N. B. Coward.

SECTION OF ANÆSTHESIA

Chairman.—Dr. W. L. Muir.
Secretary.—Dr. A. E. Murray.

SECTION OF RHEUMATIC DISEASES

Chairman.—Dr. J. W. Merritt.
Secretary.—Dr. J. C. Acker.

HOUSING AND HOTELS COMMITTEE

Chairman.—DR. A. R. MORTON.
Secretary.—DR. N. B. COWARD.

Members.—Drs. W. G. Colwell, S. H. Keshen, D. A. Forsythe, C. J. McDonald, E. K. McLellan, J. A. Noble, J. R. McLean.

REGISTRATION COMMITTEE

Chairman.—DR. H. G. GRANT.

Members.—Drs. A. L. McLean, J. W. McIntosh, E. A. Brassett, Hugh McKinnon, T. M. Sieniewicz, Murray McKay, J. J. McRitchie, W. J. Keating.

BADGES COMMITTEE

Chairman.—DR. A. G. MCLEOD.

Drs. F. F. P. Malcolm, A. M. Marshall and M. Brennan.

GOLF COMMITTEE

Chairman.—DR. W. A. CURRY.

Members.—Drs. F. V. Woodbury, W. G. Colwell, E. I. Glennister, G. Wiswell, R. S. Henderson, J. M. Stewart.

PUBLICITY COMMITTEE

Chairman.—DR. H. L. SCAMMELL.

Members.—Drs. C. S. Morton, A. L. Murphy and H. B. Atlee.

SCIENTIFIC EXHIBITS COMMITTEE

Chairmen.—DR. R. P. SMITH AND DR. D. J. MCKENZIE.

Secretary.—DR. E. F. ROSS.

Members.—Drs. V. O. Mader, V. N. McKay, G. A. McIntosh, E. T. Granville, M. Jacobson, F. G. Mack, G. Donovan, J. G. D. Campbell.

TRANSPORTATION COMMITTEE

Chairman.—DR. P. A. MCDONALD.

Members.—Drs. H. W. Kirkpatrick, T. B. Acker, A. E. Doull, Jr., W. D. Rankin, K. P. Hayes and R. C. G. Hawkins.

FINANCE COMMITTEE

Chairman.—DR. W. L. MUIR.
Secretary.—DR. C. W. HOLLAND.

Members.—Drs. H. G. Grant, M. G. Burris, A. Calder, J. G. MacDougall, A. E. Doull, Sr. and D. J. McDonald.

COMMERCIAL EXHIBITS COMMITTEE

Chairman.—DR. J. V. GRAHAM

Members.—Drs. A. E. Murray, R. H. Stoddard and G. L. Covert.

THE SCIENTIFIC EXHIBIT

One of the features of the convention will be a section reserved for a scientific exhibition of subjects of medical interest. It is the desire of the Committee in charge of this feature to make it representative of every field in medicine, and anyone wishing to provide an exhibit is requested to communicate as soon as possible with Dr. R. P. Smith or Dr. D. J. McKenzie, Pathological Institute, Morris Street, Halifax, who will be glad to furnish any information regarding this feature, as well as application forms for space and regulations for exhibitors.

The 1938 Convention in Halifax promises to be another notable stepping stone in the history of the Canadian Medical Association. Since the re-organization convention of 1921 Halifax has grown, and no small part has been the erection and operation of two large and up to date hostelries.

The Nova Scotian Hotel at the Halifax Ocean Terminals, our Headquarters, is a real Convention Hotel operated by the Canadian National Railways, and its spacious rooms will lend themselves excellently to the General Sessions and the Sectional Meetings, with ample room for Commercial and Scientific Exhibits.

The Lord Nelson, another modern hotel, will be the headquarters of the Canadian Public Health Association for their Annual Meeting on June 20th and 21st, but it will also be the home of many of you during your stay in Halifax. Facing the beautiful Public Gardens it is within easy access both to the business district and to the Headquarters Hotel where all the meetings will be held.

The Carleton Hotel, known as the "Home-like Hotel", is smaller, but visitors will find it lends itself to making their stay pleasant. It is situated just one block from the busy business section, and, again, is only a short distance from the Convention Hotel.

The Halifax, one of the older hotels, still maintains a fine reputation and guarantees its visitors to the Convention every comfort.

The Queen Hotel also has a long reputation as a hotel of quality, and many will find it a pleasant home during their stay. The two hotels last mentioned are only three blocks from the Convention Hotel.

Your Housing Committee advises you to write early for your reservations direct to the hotel of your choice. If that hotel is already booked to capacity, we will do our best to obtain for you the next best accommodation available, but do not delay. MAKE UP YOUR MIND TO BE IN HALIFAX IN JUNE.

Nova Scotian Hotel, 100 double rooms, $5.00-$6.00.

Lord Nelson Hotel, 100 double rooms, single $3.00; double $5.00 up; suites $8.00 up.

Carleton Hotel, 25 rooms, single $1.50 up; double $3.00 up.

Halifax Hotel, 75 rooms, single $2.00 up; double $3.50 up.

Queen Hotel, 75 rooms, single $1.50 up; double $2.50 up.

Hospital Service Department Notes

Anæsthesia Instructions to Interns

An excellent outline of instructions to interns, covering duties, etc., has been prepared by the department of anæsthesia of the Regina General Hospital. Responsibility is outlined, the intern is told what pre-operative study must be made of the patient, and there is a brief description of the methods of administration of the various anæsthetics. A list of pertinent "rules of thumb" are appended. These last, particularly, should be in the hands of every intern.

The Relations of Hospitals and Radiologists

A report on the existing financial arrangements between radiologists and hospitals has been issued recently by the Council on Professional Practice of the American Hospital Association. This was based on a tabulation of the returns from some 2,700 hospitals in the United States and Canada to the American College of Surgeons.

Of these hospitals (and they are a fair cross-section of the medium-sized and larger general hospitals) 94 per cent of those reporting ownership stated that the equipment was owned by the hospital. With respect to the financial arrangements between the radiologists and hospitals it was found that of the 1,571 hospitals replying to this particular question in 47.8 per cent the radiologist was on salary (full-time or part-time), in 40.8 per cent he received a percentage of the income, in 6.6 per cent the basis was concession or rental, and in 4.8 per cent no payment was made to the radiologist.

The reports have been further classified in terms of the type and size of hospitals and the size of the cities in which the hospitals are located. In general it was found that the proportion of salary arrangements increases with the size of the hospital. Thus with hospitals of 250 beds or over 71 per cent of the 354 hospitals of this size reporting had a salary arrangement with their radiologists. With hospitals of between 100 and 250 beds 48 per cent of the 629 reported a salary basis. With the 334 hospitals between 50 and 100 beds reporting the proportion was 40 per cent. Of the hospitals of between 25 and 50 beds a large proportion did not answer this question, but of the 174 responding, 35 reported a salary basis. Classification of the cities by size revealed a parallel analysis; in cities of over a million 76 per cent reported a salary arrangement; in cities of from 10,000 to 25,000 this figure had dropped to 34 per cent.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

New England Medical Centre for Rural Physicians

An institution known as the Joseph H. Pratt Diagnostic Hospital, so named in honour of the professor of clinical medicine at Tufts College Medical School, will be erected by the Boston Dispensary with the primary purpose of helping the practice of rural medicine. Special arrangements are being developed to make accurate diagnosis more readily available to the rural patient and the physician. The special problems of rural practice will be studied; rural physicians may take turns studying at the Pratt Hospital, and their expenses in Boston will be paid by Mr. William Bingham 2nd, the donor of the new hospital. Exchange doctors will be provided to substitute for them in their home towns.

Medical Societies

The Canadian Ophthalmological Society

At a recent meeting held in Toronto the Canadian Ophthalmological Society adopted a Constitution and By-laws. Dr. W. Gordon M. Byers' untiring work in connection with the formation of the Society has been rewarded by a membership of sixty of the leading practitioners doing eye work, and representing every province in the Dominion.

The following officers were elected: *President,* Dr. W. Gordon M. Byers; *Vice-president,* Dr. W. H. Lowry; *Secretary-Treasurer,* Dr. Alexander E. MacDonald; *Members of the Council,* Drs. F. T. Tooke, Colin Campbell, J. Vaillancourt, E. A. McCusker, L. de V. Chipman.

A. E. MACDONALD,
Hon. Secretary-Treasurer

Montreal Physiological Society

This Society met on December 20, 1937. Abstracts of two papers read follow.

A NEW METHOD FOR DEVELOPING A BETTER COLLATERAL BLOOD SUPPLY TO THE HEART (Preliminary Report).—M. Fauteux.

Dr. Fauteux explained the physiological principles on which he had devised a new surgical procedure for increasing the coronary circulation in coronary diseases. He calls this operation "segmentary coronariectomy", associated with ligation of the companion vein. When the operation was performed on dogs the mortality was nil and there was no clinical evidence that the coronary circulation was altered. As soon as the actual experiments have been completed a full report of this experimental work with clinical observations, electrocardiographic curves, and histological data will be presented. Then only will it be possible to draw definite conclusions and to judge the real value of this method.

AN HYPOTHETICAL CONVULSIVE MATERIAL IN THE BRAIN SUBSTANCE OF ANIMALS WHICH HAVE HAD CONVULSIONS.—H. M. Keith and D. McEachern.

In 1933 Kroll made the claim that convulsions could be produced in normal animals by the intravenous injection of extracts of brain removed from convulsing animals, while the extract from normal animals was said to be without convulsive properties. Most of these experiments were carried out in cats. The minced brains were extracted with acetone and the remaining residue suspended in saline, extracted, and filtered. This saline extract was used in the experiments. Holmes repeated these experiments, using the acetone fraction of the extract. He noted a marked constitutional effect. This frequently occurred with or without convulsions. Extracts of normal brain as well as those from the brains of convulsing animals sometimes produced convulsions, and both were equally lethal.

In the present work the experiments were repeated, using both the saline extract of residue as decribed by Kroll and the saline suspension used by Holmes. Twenty-five injections of brain extracts were made intravenously in 19 animals in an attempt to produce convulsions. Following six of these injections there was slight convulsive movement only. Twenty of the twenty-five injections resulted in marked generalized symptoms, such as described by Holmes. These severe generalized symptoms followed the injection of extracts from normal brains and extracts from convulsed brains. These experiments, then, offered no support to Kroll's claim. They did not, however, rule out the occurrence of some unrecognized convulsing substance whose effects may have been masked by the marked general symptoms. It is also quite possible that some convulsive substance might have appeared with explosive rapidity and disappeared quickly, before the extract could be made.

J. F. MCINTOSH

The Moose Jaw and District Medical Society

This Society held a November dinner meeting in the Grant Hall Hotel. About thirty were present. After dinner two films were shown by Mr. Ryan, of the Smith & Nephew Company. One dealt with the treatment of fractures and the other with the injection treatment of varicose veins and ulcers.

Dr. Lennox Bell, of Winnipeg, then gave a paper on "Recent advances on therapeutics". He dealt with the use of sulphanilamide in infections, anti-pneumococcal serum in pneumonia, and the recent work in vitamin therapy. He stressed the importance of proper dosage in the

use of sulphanilamide and referred to its indications and limitations. He emphasized the importance of "typing" the sputum in pneumonia and the great reduction of mortality when the serum is used in properly selected cases and given early. The paper was very well received and commented on most favourably.

LILLIAN A. CHASE

Prince Albert and District Medical Association

Dr. Willard S. Holmes, of Saskatoon, gave a paper on "Toxæmias occurring late in pregnancy", at the December dinner meeting. He stressed the importance of watching for gain in weight of more than 25 pounds, rise of blood pressure past 140, and albumin in the urine as the earliest indications of pre-eclamptic and eclamptic conditions. He made a plea for more adequate pre-natal care, and pointed out from his own statistics that the only occasions he had seen eclampsia were in patients receiving no supervision prior to the onset of convulsions. The management of these cases was outlined. Eclampsia is an arteriolar disease. The need for watching the eye grounds was stressed, as they usually gave the first indications of the approach of severe toxæmia. Dr. Holmes stated that operative procedures, such as Cæsarean section, had no place in the management of the eclamptic patients.

Dr. Iva C. Molony, who has been transferred from Fort Qu'Appelle Sanatorium to the Prince Albert institution, was welcomed to the Association. Surgical moving pictures of "Depressed skull fracture" and "Repair of inguinal hernia" were shown.

LILLIAN A. CHASE

The Regina and District Medical Society

The members of this Society presented a silver water pitcher to Dr. Hugh MacLean before his departure for California. Dr. MacLean has practised twenty-nine years in Saskatchewan. He has been active in medical societies, having been president of the Regina and District Medical Society, president of the Staff of the General Hospital, and president of the Staff of the Grey Nun's Hospital. Dr. Charles May expressed the regret of the members at Dr. MacLean's departure.

Dr. L. H. McConnell, Saskatoon, spoke on "Diagnosis and treatment of intracranial lesions". The brain is the fourth commonest location for tumour. The commonest is the uterus; second, the stomach; third, the breast; and fourth, the brain. Eighteen per cent of patients with brain tumour have no headache. Many patients diagnosed as having "stroke" on further investigation prove to have brain tumour. A patient waking up with headache should be carefully investigated for brain tumour. Papillœdema is a most important symptom. As soon as intracranial pressure is increased pressure of the disc appears. The pulse rate is not often altered very much except in brain abscesses. Frontal lobe tumours affect the judgment and personality of the patient. It is Dr. McConnell's opinion that 4 per cent of all patients in the mental hospitals have brain tumour. In temporal lobe tumour, if it is on the left side, there is a speech upset, the patient may complain of unpleasant smells, and may have dreamy states and a sense of unreality. With the parietal lobe tumour there is a sensory upset. Occipital tumour is the rarest. With it there is a visual upset. A cerebellar tumour is not difficult to diagnose if purely cerebellar. The patient also gets hydrocephalus. If it is near the nuclei there is a nystagmus. If the general practitioner can diagnose the presence of a brain tumour he is doing very well. The location can be left to the specialist. The specialist must locate the tumour because an operation in the wrong place means a death certificate. A tumour of the third ventricle has few symptoms and can be diagnosed by putting in air. The tumour of the lateral ventricle is not easy to diagnose. With it there are rapid changes in blood pressure. Dr. McConnell was emphatic in stating that air should never be put in by the spinal column in a case showing papillœdema. A spinal puncture should never be done on a brain case. Death has followed on the removal of as little as 3 c.c. of spinal fluid. Air should be put in through the upper part of the occipital region. X-ray plates were shown of interesting cases.

Dr. O. E. Rothwell expressed the appreciation of the members for Dr. McConnell's address.

At a recent meeting of this Society a report was received from the committee on the medical care of city relief patients. They stated that in 1937 the doctors' fees were $30,500; dentists' fees $3,500; hospital bills $48,000; drugs and glasses $14,000; making a total of $96,000. The average monthly number of people on relief in Regina for the first nine months of the year 1937 was 9,333. The cost of drugs was $0.12 per person per month. The provincial government and the federal government pay none of these costs. The entire cost is borne by the taxpayers of the city of Regina. In addition to this burden the tax-payers pay 20 per cent of all other relief costs for these people. The provincial government pays 80 per cent of the costs for food, clothing, and shelter.

A farewell banquet was tendered by the Regina and District Medical Society to Dr. Sydney Larson on the eve of his departure for Rochester, N.Y., where he has gone to take special work in radiology. The members presented Dr. Larson with a silver tray.

LILLIAN A. CHASE

Staff Meeting, Regina General Hospital

At the December staff meeting of the Regina General Hospital appendicitis was discussed. Dr. David Low submitted the following classification for appendicitis: chronic; subacute; acute; catarrhal; (1) suppurative, (2) gangrenous, (3) ruptured, (*a*) local, (*b*) gangrenous, (*c*) abscess.

APPENDICITIS IN REGINA GENERAL HOSPITAL FOR SIX YEARS

	1931	*1932*	*1933*	*1934*	*1935*	*1936*	*Percentage*
Chronic appendicitis	106	107	88	145	130	98	
Deaths	2	–	2	–	2	2	
Percentage	1.88%	0%	2.27%	0%	1.5%	2.0%	1.1%
Acute appendicitis	252	243	276	330	301	225	
Deaths	5	4	4	4	3	3	
Percentage	1.98%	1.64%	1.48%	1.2%	1.0%	1.3%	1.4%
Acute ruptured appendicitis	21	23	22	36	30	21	
Deaths	4	1	1	1	1	–	
Percentage	19.0%	21.0%	18.2%	8.3%	13.3%	5.0%	14.3%
Acute gangrenous appendicitis	13	27	23	35	17	31	
Deaths	1	1	1	1	1	–	
Percentage	7.7%	3.7%	4.3%	2.8%	6.0%	0%	3.4%
Acute gangrenous ruptured appendicitis	21	15	6	10	7	2	
Deaths	4	3	3	2	1	–	
Percentage	19.0%	20.0%	50.0%	20.0%	14.3%	0%	21.3%
Subacute appendicitis	111	149	138	150	167	191	
Deaths	–	2	–	1	1	–	
Percentage	0%	1.3%	0%	0.66%	0.6%	0%	0.44%
Total number of cases	524	564	553	206	652	568	
Total number of deaths	16	15	14	11	12	7	
Percentage	3.0%	2.67%	2.53%	1.56%	1.84%	1.23%	

Dr. H. L. Jackes recommended deferred surgery in cases in which the appendix is already ruptured. He quoted figures to show the highest mortality is on the fourth day after the rupture. If the pulse, temperature and white blood count are increasing, drainage should be instituted.

Letters, Notes and Queries

Panel Practice in Britain

To the Editor:

Dr. W. A. Jones' plea in your January number* for opinions regarding the Panel System from medical men who have had practical experience with the system has inspired this letter.

I studied for higher degrees for two years in England and, as is a common custom, did locum work under the panel system between examinations. My four months' experience in panel practice was without prejudice and was representative of three different localities, *viz.*: (1) a crowded North East London area near the Angel; (2) a suburb of London twenty-five miles from Charing Cross; (3) a depressed mining valley of South Wales. The last was a contract mining practice identical with the situation described by Cronin the *The Citadel.* In his story I relived my experiences in Wales, and I feel that this part of the story is authentic and not dramatized beyond legitimate bounds.

My experience with the panel system would not permit me to agree with the Editor that the merits exceed the demerits. I found that a respectable livelihood can be made by the medical man with a full panel, but only by neglecting careful scientific investigation and treatment of his patients. I know one Canadian who went to England to take higher degrees and who was obliged by economic pressure to take a panel practice. He now has four surgeries, two assistants, and is making more money than he would in Canada. But he has been obliged to forego any pride in scientific care of his cases. The busy panel practice resolves itself into a "Clearing Station". The only major decision made is whether the patient is really ill or not. If he is really ill he is sent to the local hospital, and the expense and responsibility are shifted to that quarter. If he is not considered to be really ill some of the panel prescriptions will be prescribed.

Let us consider the doctor with a full panel of two thousand patients. He will receive five thousand dollars for their care. He may face thirty patients in his office around the small fireplace when he arrives on a cold wintry morn-

* The *Journal*, 1938, 38: 66.

ing. Could any one doctor adequately investigate these patients' complaints in the allotted time? Again the doctor is reminded that every extra investigation or treatment (beyond the Panel Pharmacopœia) comes out of his five thousand dollars. It is not unnatural that he provides as little as possible. I was informed once, in a half-humorous, half-serious way, that the supply of medicine bottles could be maintained by requesting routine urine specimens, on which we religiously did the "sink test".

Now, it may be that the really ill patient sent to a closed hospital is better treated than he would be by the general practitioner. But if this system were to be universally adopted, I think it would sacrifice the professional prestige of 90 per cent of the medical men in Canada. The English public differs markedly from the Canadian and American public. This is reflected in the manner in which the public patients are treated in the out-patient departments of the large hospitals. In England, I have seen men in a row holding their trousers, awaiting their turn for hæmorrhoidal injections—the doctor seated in a swivel chair. In a New York out-patient department I have seen individual dressing cubicles for patients with flat feet—the doctor running from cubicle to cubicle. The average English panel patient will, unless grossly abused, continue with whatever locum or doctor takes over the panel. He has the option of changing his doctor but rarely exercises this privilege. This is shown by the fact that the purchasing or selling price of a panel is relatively fixed by the number of patients who have contracted with that panel, and the money to purchase such a panel may be borrowed readily from medical agencies as the panel is known to have a definite value. The Canadian public has been educated to an independence and freedom of choice which their staid English cousins would never dream of. Class distinction, which is still definitely in evidence in England, is responsible for this. Our average citizen has a wide education in medical matters, and often the explanation of the condition to the patient and relatives requires as long as the treatment. No such explanation is looked for by the panel patient or his relatives. The doctor's position is established in the panel community and his treatment never questioned.

It is this difference in the people of the two countries which impresses me most as an obstacle to the employment of a panel system in Canada. Any system adopted in this country should be adapted to the demands of our citizens. I mean that the doctor must allot more time per patient, hence have fewer patients, and as a result be paid relatively more per patient if the system is to satisfy the public or recompense the doctor.

I have discussed this matter with twenty or thirty Canadian and Australian students who did panel practice as I did, and I feel that this note is an expression of the feeling of the majority of those men. I may have seen the less fortunate side of panel practice, and I may be mistaken, and would welcome discussion by others who have done panel practice, whether it be corroborative of my views or otherwise.

Peterborough, Ont., January 13, 1938. R. K. MAGEE, B.A., M.D., F.R.C.S.

Abstracts from Current Literature

Medicine

The Criteria for the Diagnosis of Coronary Disease. White, P. D., *New Eng. J. Med.*, 1937, 217: 783.

Coronary disease has come to imply atherosclerotic changes in the coronary arteries themselves, sufficient to interfere seriously with their function. The criteria for its clinical diagnosis are three in number, and only three: (1) angina pectoris in the absence of luetic aortitis and of extensive aortic valve stenosis or regurgitation; (2) coronary thrombosis that can be clinically recognized; and (3) certain electrocardiographic abnormalities, with or without angina pectoris or recent or old coronary thrombosis.

Angina pectoris is characterized by a feeling of retrosternal discomfort, generally a feeling of oppression or weight, characteristically appearing for the first time on ordinary effort, particularly on walking up grade or hurriedly after meals and in cold weather, lasting a few minutes, and subsiding quickly on resting or following the use of nitrites. It may be high, low or intermediate in position. It may radiate to one arm or both. Any other kind or circumstance of anterior chest pain is to be interpreted as angina pectoris only after the most careful and intensive study. Angina pectoris is not the commonest type of dolor pectoris.

The most difficult feature of angina pectoris is its differential diagnosis from the discomfort caused by gastric or œsophageal spasm. The most important points of differentiation are that angina pectoris due to coronary disease is characteristically caused by effort at its inception and not by meals or excitement; that it is not burning but dull and heavy; and that it is in most cases attended by electrocardiographic changes.

The second criterion, coronary thrombosis, is less likely to be missed than is angina pectoris of a paroxysmal nature. At present the danger lies in over-diagnosis. Several conditions wrongly called coronary thrombosis are acute indigestion or intestinal intoxication. Pulmonary embolism is often mistakenly called coronary thrombosis. The rare dissecting aneurysm is easily confused. Paroxysms of tachycardia may be wrongly interpreted.

The third criterion is electrocardiographic evidence, which is as good as the other two criteria. Bundle-branch block appearing under observation in middle or old age or in the third or fourth decades means coronary disease; characteristic coronary T waves similarly, in the absence of active diphtheritic or rheumatic infection or of digitalis intoxication, mean coronary disease. The coronary disease revealed by the electrocardiogram may not be immediately serious or fatal, but it is always important and demands at least a very careful analysis.

In the last fifteen years the author has had 1,518 patients with unquestioned coronary disease. Males outnumbered females, 1,192 to 326. Angina pectoris occurred in 1,097, coronary thrombosis in 542; 251 patients had both angina pectoris and coronary thrombosis. The remaining 130 of the 1,518 cases (9 per cent) showed clear evidence in their electrocardiograms without history of either angina pectoris or coronary thrombosis.

No other evidence means coronary disease. Cardiac enlargement, hypertension, arrhythmias (including premature beats, paroxysmal tachycardia, and auricular fibrillation, but excluding heart block), dyspnœa, congestive failure of either ventricle or both, and even sudden death, although often found with coronary disease, do not prove its presence. Many cases, however, are carelessly so labeled, especially those of older patients with auricular fibrillation.

LILLIAN A. CHASE

Disturbances of Rate and Rhythm in Acute Coronary Artery Thrombosis. Master, A. M., Dack, S. and Jaffe, H. L., *Ann. Int. Med.*, 1937, 11: 735.

Conclusions are drawn from a study of 300 cases of coronary artery thrombosis. All types of irregularities were present. Premature beats were found in one-quarter of the patients. Other arrhythmias occurred 46 times in 42 patients. Of these, auricular fibrillation comprised one-half. Arrhythmias usually appeared during the first three days following an occlusion, and with the exception of nodal rhythm and heart block, which may last one or two weeks, were transitory. The mortality rate of the patients with arrhythmias, excluding those with premature beats only, was almost double that of the patients with regular sinus rhythm. Half the deaths occurred after cessation of the arrhythmia, and only rarely was the arrhythmia itself the cause of death. The cardiac rate was a very significant factor in the outcome of an attack. If the ventricular rate was over 120 or under 40 beats per minute, whether the rhythm was regular or irregular, the outlook was poor; when a rate of between 60 and 100 was maintained the patient almost always recovered.

An arrhythmia may be the first and only sign of coronary artery thrombosis. The sudden onset of an arrhythmia should suggest the diagnosis of coronary occlusion. The site of infarction does not determine the type of cardiac irregularity, except that thrombosis of the right coronary artery with posterior wall infarction was usually found in the fatal cases with heart block.

Specific treatment of the arrhythmias is unnecessary. Digitalis and quinidine are considered dangerous in the treatment of coronary artery thrombosis as they may actually initiate arrhythmias. Only when a persisting irregularity produces severe shock or increasing heart failure should they be given. At the onset morphine may be given liberally.

H. GODFREY BIRD

Clinic on Coronary Thrombosis: Clinical Features Frequently Misinterpreted. Willius, F. A., *Proc. Staff, Mayo Clinic*, 1937, 12: 718.

It is important to appreciate fully the less common manifestations of coronary thrombosis so that prompt recognition will permit the institution of complete rest. A case in a man 42 is described. He had attacks of retrosternal pain, increasing in frequency. Physical examination was normal. The heart was not enlarged. The electrocardiogram in the conventional leads did not give any evidence of abnormalities, but lead IV, made according to the method of Wolferth, revealed a positive (upright) T-wave which is normally negative (inverted). A diagnosis of recent coronary thrombosis with acute cardiac infarction and recurrent anginal seizures was made and six weeks' complete bed rest was prescribed.

When the incidence of a disease is increasing its subjective and objective manifestations are likely to be atypical.

LILLIAN A. CHASE

The Sedimentation Rate in Angina Pectoris and Coronary Thrombosis. Riseman, J. E. F. and Brown, M. G., *Am. J. M. Sc.*, 1937, 194: 392.

The authors have found the corrected sedimentation index a valuable aid in distinguishing between angina pectoris and coronary thrombosis. A moderate elevation of the corrected sedimentation index (0.73 to 1.38) may occur in about half the patients with angina pectoris, suggesting myocardial damage. However, in the clinical syndrome of coronary thrombosis sedimentation indices of much higher magnitude are encountered. The fastest rates are observed between the fourth and twelfth days after the onset of symptoms. The sedimentation rate was found to reflect the progress of the patient, but was of little aid in prognosis of the acute attack. The mortality of patients discharged from the hospital with fast sedimentation rates was twice as great during the first year as that of patients who had normal or low rates. The authors

suggest that patients convalescing from coronary thrombosis be confined to bed until their corrected sedimentation index is normal or shows no further progress towards normal.

E. S. MILLS

Surgery

Gastric Surgery and Gastroscopy. Schindler, R. and Giere, N., *Arch. Surg.*, 1937, 35: 712.

Among the questions which the authors discuss are:

1. Is a lesion of the stomach which has been diagnosed by other methods a benign ulcer or a carcinoma?

2. Is cancer of the stomach operable or not?

3. Of what value is gastroscopy in the early diagnosis of carcinoma, and may it improve the operative results?

4. What are the reasons for the abdominal distress which so frequently follows operations for gastric lesions? They endeavour to show the value and usefulness of gastroscopy to the surgeon.

Four hundred and sixty-five gastroscopies were performed; 41 of the patients on whom gastroscopy was performed also received surgical treatment. The latter group furnished the material for this paper. Biopsie control was possible in twenty cases. Twenty-eight gastroscopic examinations were carried out on the 41 patients. It must be admitted that negative findings in gastroscopy are not entirely conclusive, though the diagnosis was confirmed in every instance in which the authors had biopsic control. The differential diagnosis between benign and malignant ulceration is not difficult to determine after a gastroscopic examination by one trained in the field, even in the very early stage biopsy is not necessary. The differentiation between benign and malignant obstruction is more difficult but also possible. Gastroscopic diagnosis was proved to be correct in each of 7 patients. The operability of carcinoma was best determined by gastroscopy. Early gastroscopy together with an early roentgenogram is able to reveal operable carcinoma. Gastroscopy was proved to be superior to roentgen examination in certain cases. Gastroscopy and roentgenography supplement each other. Early diagnosis of gastric carcinoma can be brought about if each patient over 35 years of age who suffers from anorexia or significant loss of weight, and in whom no other explanation for the symptoms is found, is immediately examined gastroscopically and roentgenographically.

G. E. LEARMONTH

Subtotal Gastric Resection for Peptic Ulcer. Miller, G., *Surg., Gyn. & Obst.*, 1937, 65: 489.

The indications for resection are the removal of the acid-secreting portion of the stomach and the more rapid emptying time, with some regurgitation of the alkaline duodenal contents. The author contends that the results obtained from this operation in persistent recurrent ulcers after repeated operations warrants its use in all cases if the mortality can be kept below 5 per cent. It is a physiologically sound operation. The causes of failure to relieve all gastro-intestinal symptoms are due to small stomach symptoms, poor functioning of the stoma, recurrence of the ulcer, and the occurrence of marginal ulcer and gastrocolic or jejunocolic fistula. If the author cannot use local anæsthesia he prefers high nupercainal spinal anæsthesia, with, later, a splanchnic nerve block. He favours the Finsterer method basically, and gives the exact technique for the various problems encountered. Water is given after 24 hours with gradual increase to full diet by discharge on the twelfth or fourteenth day. Carbon dioxide rebreathing is given for a few minutes several times daily for three or four days. Recurrent or marginal ulcers are signs of incomplete operation. Anæmia is probably due to incomplete absorption of or inadequacy of food.

FRANK DORRANCE

Lipiodol Visualization of the Bile Tracts in Lesions with Jaundice. Baker, H. L. and Bacon, C. M., *Surg., Gyn. & Obst.*, 1937, 65: 220.

The authors have used lipiodol in preference to diodrast inasmuch as it is more viscid. The lipiodol was injected at 99 to 100° F. in quantities of 10 to 20 c.c. through the drainage tube following a cholecystotomy or through the T-tube in the common bile duct. Injection with immediate radiography during operation may be done to eliminate the possibility of common duct stone, or post-operatively to define the amount of resolution of an acute or chronic pancreatitis, or 10 to 15 days after operation, to differentiate between the induration due to chronic pancreatitis or carcinoma of the head of the pancreas when such is not possible at the time of operation.

FRANK DORRANCE

Obstetrics and Gynæcology

Maternal Morbidity. Grier, R. M., *Am. J. Obst. & Gyn.*, 1937, 34: 28.

The conclusions reached are based on a study of 4,837 deliveries in Evanston Hospital from 1930 to 1935. The standard used was that of the American College of Surgeons. Low-forceps delivery occurred in 40.7 per cent of the cases, but the morbidity rate, 5.2 per cent, differed but little from that of spontaneous delivery, 3.8 per cent. There was little difference in the morbidity rate whether rupture of the membranes occurred spontaneously or artificially. Medical induction did not increase morbidity.

Uterine packing carried a high rate of morbidity, but it should not be delayed too long as the hæmorrhage is equally dangerous. Excellent work may be done in a general hospital where the majority of the work is done by a well-controlled group of trained obstetricians.

Morbidity can be reduced by keeping to a minimum the more radical types of delivery such as mid- and high-forceps, version and extraction, and Cæsarean section, by lessening through conservative obstetrics the number of cervical tears, by maintaining a good delivery room technique, avoiding changes in the nursing staff, and by keeping an analysis of work done for which good records are essential.

ROSS MITCHELL

Puerperal Infections in Relation to Midwifery Attendants. Wood, J. L. M., *Brit. M. J.*, 1937, 2: 811.

Not only for the benefit of the patient but also in the interest of the attendants all cases of pyrexia during the puerperium should be investigated as a routine. If in the course of this investigation one of the attendants is found to harbour the *S. pyogenes* in his or her throat or air-passages then work in midwifery should be suspended until the attendant is bacteriologically negative, whether shown to have been the actual cause of the infection or not; this would also apply to streptococcal infections in the midwifery practitioner. Although such rules appear very stringent at first sight the prospect of obtaining the swab-negative state is not so gloomy as might be imagined. The swabbing of clinically normal throats, unless they are believed to be a source of infection, cannot be too much deprecated. ROSS MITCHELL

The Treatment of Varicose Veins in Pregnancy. Solomon, E., *J. Obst. & Gyn. Brit. Emp.*, 1937, 44: 650.

Sixty pregnant women suffering from varicose veins were treated with the injection of quinine urethane. Satisfactory results were obtained in 97 per cent. Although slight inflammatory reactions occurred in some cases the relief obtained more than compensated for the previous discomfort. No serious complication resulted. The puerperia so far as could be ascertained were uncomplicated. Of 3 patients who had subsequent pregnancies only 1 had a slight recurrence of varicose veins. The injection of quinine urethane in 2 c.c. doses does not affect the pregnant uterus. ROSS MITCHELL

Pædiatrics

Ileocæcal Lymphadenitis in Children. Brown, A. E., *Surg., Gyn. & Obst.*, 1937, 65: 798.

The author reports 30 proved cases in children between 2 and 16 years. He recognizes acute and subacute cases. He has been able to make a pre-operative diagnosis by the colicky nature of the pain with its sudden onset and as sudden disappearance, the tenderness localized more to the median line than McBurney's point, and, in the acute cases, the marked toxicity. All of these 30 cases have been under observation over 13 years; some have been under observation as long as 7 years before operation. In none of them has macroscopic inflammation of the vermiform appendix been present; yet in all of them appendicectomy has caused disappearance of the pain. He has not found tuberculous infection in any; x-rays taken several years after in 8 have not revealed calcification. The most surprising factor is that the lymph nodes in the mesentery of the appendix have not been involved, despite the ileocæcal involvement in 25 of them, cæcal in 5, right common iliac in 3, root of the mesentery in 6, mesentery of the lower ileum in 7, and median common iliac in 1.

FRANK DORRANCE

Therapeutics

The Treatment of Myasthenia Gravis. Thorner, M. W. and Yaskin, J. C., *Am. J. M. Sc.*, 1937, 194: 411.

Thorner and Yaskin have studied the therapeutic effect of various drugs in the treatment of 6 cases of myasthenia gravis. Aminoacetic acid, potassium chloride, and roentgenotherapy were found to produce no beneficial results. Ephedrine and benzedrine were found advantageous in 3 cases, particularly when combined with prostigmin. Prostigmin proved valuable in the treatment of all 6 cases of myasthenia gravis; three of the 6 patients were able to return to work. The dosage of benzedrine recommended is three 10 mg. tablets daily combined with five to seven 15 mg. tablets of prostigmin. In many cases prostigmin alone is effective in the dosage already indicated. All 6 patients showed a gain of weight, varying from 5 to 25 pounds. Occasional diarrhœas were controlled easily with tablets of atropine, gr. 1/150, taken orally when necessary. The disadvantages of prostigmin therapy are two—the expense of the drug and its tendency to produce diarrhœa and sweating when given in large quantities.

E. S. MILLS

Chronic Arsenical Poisoning During the Treatment of Chronic Myeloid Leukæmia. Kondel, E. V. and LeRoy, G. V., *Arch. Int. Med.*, 1937, 60: 846.

X-ray treatment banished the use of arsenical preparations in this disease until 1931, when successful treatment by potassium arsenite was again reported. This therapy is used along with x-ray, which seems to have some effect in lowering the white cell count when applied to the enlarged lymph nodes. In several cases reported the disease was controlled by arsenical treatment

alone, *i.e.*, five minims of potassium arsenite solution three times a day or, beginning with this dose, increasing by one minim a day until 9 drops t.i.d. are given and then stopping for 3 weeks. One disadvantage of the second method was that the white cell count got out of control in the resting stage. X-ray treatment apparently is able to "rescue" the cases where this has happened. As might be expected, some patients could not tolerate the arsenic, as shown by gastro-intestinal upset. There is a great variation in susceptibility; also the preparation of arsenic used is very important. Complications during treatment include cirrhosis, insidious in onset, affections of the nervous system, often heralded by an attack of herpes zoster and perhaps going on to extensive paralysis, and skin lesions, keratosis, and in syphilitic treatment exfoliating dermatitis. Excretion is mostly by the kidney while the organs in which the greatest amount of the substance is found are the brain, with the liver next in order.

P. M. MACDONNELL

Pathology and Experimental Medicine

Acute Myeloid Leukæmia in One of Identical Twins. Kellett, C. E., *Arch. Dis. Child.*, 1937, 12: 239.

The place which identical twins occupy in the realm of scientific medicine in furnishing a control for theories advanced as to the etiology of disease is well recognized. Here is reported a case of acute myeloid leukæmia in one of twin sisters, whose points of resemblance (hair and eye colour, direction of hair-whorl on the head, finger prints, measurements, refractive errors in eyes, blood group) would indicate that they were uniovular. One developed the disease in January, 1937. She had attacks of prolonged bleeding from the nose, was anæmic, had a normal-sized spleen, and showed no enlargement of the lymph glands. Her white blood count was only 7,500 on admission, with over 90 per cent of the cells of the primordial type. Six weeks later the count had risen to 133,000, with 98 per cent of the cells in this category, and the spleen had become enormous. She died about 6 weeks later after the diagnosis of myeloid leukæmia was made.

The twin sister remained perfectly well throughout this period, with a blood count in April, 1937, of 5,600 white blood cells; of which 60 per cent were polymorphonuclears. Because of the disease being absent from the second twin, the author argues that a purely hereditary factor cannot be at the basis of myeloid leukæmia, but that some external factor present in one twin and not the other must have precipitated the disease. The idea that this may be some non-specific infective process to which the patient with leukæmia reacts in an unusual manner is discussed, also the idea that some specific factor of low infectivity is responsible for the disease. Analysis of the cases of leukæmia that have been encountered in the district for the last five years is thought to lend support to this latter view.

(Abstracter's note.—To assume that myeloid leukæmia is not hereditary because one twin has failed to show the disease within three months of the onset in the other twin, is to overlook entirely the possibility that the second twin may develop the disease within a year or two year's time. A differential action of external factors on identical hereditary backgrounds may account for the different response of the twins; on the other hand no such external factor need be invoked until it is definitely proved that the second twin will not have leukæmia.)

MADGE THURLOW MACKLIN

A Dysgerminoma Removed During Pregnancy. Stabler, F., *J. Obst. & Gyn. Brit. Emp.*, 1937, 44: 705.

Dysgerminoma of the ovary has been recently recognized as an individual growth in the ovary.

Cells representing both male and female mesenchymal cords of embryonic ovary tissue are seen. Some areas show cords of tubules growing down to meet the seminiferous tubules. In other areas granulosa cells with collections of lymphocytes and areas of degeneration are seen. These indifferent granulosa cells may be carried into adult life by subjects of imperfect gonadal development, such as cryptorchids. Hermaphrodites present dysgerminoma more frequently than normal individuals. R. Meyer found that out of 48 cases, 27 were found in pseudohermaphrodites and 21 in normal women. This growth may effect one gonad or both. The tumour tends to occur at an early age, usually in the second or third decade. The author only knows of one other case occurring with pregnancy. The tumour removed was firm, solid, smooth, light fawn in colour, with some yellow areas of necrosis. Microscopically, the cells are large, round, with hyperchromatic nuclei, with a small amount of clear-staining cytoplasm arranged in parallel columns and masses separated by narrow strands of connective tissue. The capsule is not invaded.

P. J. KEARNS

The Urinary Excretion of Androgenic and Œstrogenic Substances in Certain Endocrine States. Studies in Hypogonadism, Gynæcomastia and Virilism. Kenyon, A. T., Gallagher, T. F., Peterson, D. H., Dorfman, R. I. and Koch, F. C., *J. Clin. Investigation*, 1937, 16: 705.

The comparison of the excretion of male and female hormone-like substances with the clinical expressions of disease may be expected to teach us the extent to which studies of the urine reveal the changing functions of the gonads, and may help to illuminate the difficult

pathological physiology of such obscure processes as virilism and gynæcomastia. The authors studied conditions of hypogonadism in the male—castration, eunuchoidism, and cryptorchidism; precocious puberty and gynæcomastia; and virilism in the female. Two castrated men excreted traces only of androgenic and œstrogenic substances. Seven eunuchoids excreted on the average a third of the normal amount of androgens, overlapping the normal range on occasion; the output of œstrogens was also low. In four cases of gynæcomastia no excess of œstrogenic material was excreted; the androgens varied from none to a normal amount. Sixteen patients with virilism excreted as a rule normal amounts of androgenic material. A moderate excess of androgens is occasionally found and the great excess of 480 international units per day was found in one case of carcinoma of the adrenal cortex. The authors have had no case of virilism in which there was increased excretion of œstrogens.

A. G. NICHOLLS

Anæsthesia

Episubdural Anæsthesia. Soresi, A. L., *Current Res. in Anæsth. & Anal.*, 1937, **16**: 306.

A new technique combining the advantages of subarachnoid block and epidural block is described by the author, who has employed it successfully in over 200 cases. The disadvantages common to either method used singly are minimized and the advantages enhanced by the use of the combined method. It results in a lengthening of the period of surgical relaxation and anæsthesia and gives a sustained relief from pain for a period of 24 to 48 hours during the post-operative period.

The rationale behind the method is that, as subarachnoid anæsthesia is beginning to wane, that resulting from the epidural block is beginning to intensify and the period of anæsthesia is prolonged. The technique is fairly simple and is done at the one injection. The patient is given an injection of 7½ gr. of caffein about 20 minutes before the operation. After anæsthetizing the site of puncture with novocain solution, 1:200, a fine spinal needle is pushed in until a hanging drop, previously attached to the hub of the needle, is drawn inwards as the point enters the epidural space with its attendant negative pressure. An ampoule of caffein (7½ gr.) is drawn into a 10 c.c. syringe and 200 mg. of novocain crystals are added to the syringe, together with enough sterile distilled water to make 7 to 8 c.c. of solution. The entire mixture is injected slowly into the epidural space while the spiral needle is held firmly in the correct position.

When all has been injected the 10 c.c. syringe is detached, and the needle advanced until it enters the subarachnoid space when spinal fluid will drip freely from the end. According to the size of the patient 100, 120 or 150 mg. of novocain crystals are dissolved in about 2 c.c. of spinal fluid and injected as in ordinary subarachnoid block. The patient is then placed on his back on the operating table and hypodermoclysis is started with two needles inserted into the thighs. About 1,000 to 2,000 c.c. of normal saline are given in this way during the operation and immediately afterward.

The author deprecates the use of sedatives either before or during the anæsthesia, and is convinced that the patient's fear or restlessness can be controlled by the attentions of the anæsthetist. He places great confidence in the effect played by the administration of caffein before and during the anæsthesia, and considers that it prevents and counteracts the depressing influence of the novocain. The reason for the small volume of the epidural injection (about 8 c.c.) is that normally the pressure in this space is negative and large volumes will alter this, making it positive, and thus upset the normal physiological activity. He attributes the troubles noticed in ordinary epidural anæsthesia to this increase in pressure.

The anæsthetic effect by this method is prolonged for 24 to 48 hours. This does not mean that surgical anæsthesia lasts that long but that sufficient anæsthesia remains to prevent the feeling of post-operative pain. Convalescence and final recovery are hastened and the terror of post-operative pain is abolished.

F. ARTHUR H. WILKINSON

Hygiene and Public Health

Zinc Sulphate Nasal Spray in the Prophylaxis of Poliomyelitis. Tisdall, F. F., Brown, A., Defries, R. D., Ross, M. A. and Sellers, A. H., *Canad. Pub. Health Jour.*, 1937, **28**: 523.

The claim that nasal spraying with certain chemicals will act as a prophylactic in poliomyelitis has evoked widespread interest. The recent epidemic of poliomyelitis in Ontario gave an opportunity to try out the method. A solution of 1 per cent zinc sulphate, 1 per cent pontocaine, and 0.5 per cent sodium chloride was used. The public was advised by paid advertisements in the newspapers that children between the ages of 3 and 10 might receive this treatment at certain designated centres in the city of Toronto. Only trained oto-laryngologists were used and the technique employed was that recommended by Peet, Echols and Richter.

5,223 children were sprayed between August 31st and September 5th; of these 4,585 returned for a second treatment between October 10th and October 15th. Added to this number were some cases treated privately by the same oto-laryngologists, making a total of 4,713 children resident in Toronto who were treated twice. It

is impossible to determine satisfactorily whether the spray was properly applied in all cases (a number of children did not lose their sense of smell), but since the application in all cases was made by specially trained men it is unlikely that a better application could be secured on a large scale.

Among the 4,713 children sprayed 11 cases of poliomyelitis occurred within 30 days following the second spraying. Within the same period of time 18 cases occurred among 6,300 control children. The difference is not statistically significant. The study, therefore, furnishes no evidence of the protective value of the procedure. The difficulties in the way of applying this method on a very large scale make it doubtful whether it will become a practical public health procedure.

FRANK G. PEDLEY

Exposure to Trichlorethylene. *Industrial Bull., New York State Dept. of Labor*, November, 1937, p. 16.

Trichlorethylene, $CHCl = CCl_2$, is used quite extensively in industry as a degreasing agent. The following trade names are listed: Benzinol, Blacosolv, Cecolene, Chlorylen, Circosolv, *Flack-Flip, Lanadin, Lithurin,* Perm-A-Chlor, Petzinol, Trial, Triclene; Trialin and Vestrol.

No fatal cases have been reported in the American literature, but elsewhere 284 cases of poisoning have been collected by Stüber of which 26 were fatal. The symptoms which are to be looked for are chiefly gastro-intestinal (nausea, vomiting and colic) and central nervous (headache, dizziness, unconsciousness).

Three cases are reported of possible trichlorethylene poisoning. Liver damage is to be feared.

FRANK G. PEDLEY

Obituaries

Dr. Thomas Armstrong, of Halifax, N.S., died at his home on December 17, 1937, shortly after his return from England, where he was undergoing treatment. Dr. Armstrong was born in Glasgow, Scotland in 1869, and was a graduate of Glasgow University (1895). Up to the time of his illness he had been following the sea as ship's doctor on a cable boat. Surviving him are his widow, and one brother, Dr. Robert Armstrong.

Dr. Joseph S. Brooks, of Weston, Ont., died on December 8, 1937, in his seventy-third year. He was a native of Bond Head, Ont., and had practised in Little Current, Sask., and Tottenham before coming to Weston seven years ago.

Dr. Tancrede Charles Gaboury, of Montreal, former collector of provincial revenue for the district of Montreal and ex-member of the Legislature for Pontiac, died on December 28, 1937.

Dr. Gaboury was born at St. Jean Baptiste de Rouville, on March 13, 1851, the son of Jean Baptiste Gaboury and Rosalie Malo. Following his classical studies at St. Hyacinthe College he studied at Ottawa University and the Montreal College of Medicine. He was the first French-Canadian doctor to open an office in Pontiac county, where he practised his profession for nearly 50 years.

Dr. Gaboury was mayor of Bryson for five years. He ran as a Liberal in the federal election of 1896 but was defeated by W. W. J. Poupore. He was elected to the Quebec Legislature in 1908. He married Mary Jane Fletcher, of Rigaud, who predeceased him in 1936.

Dr. Raymond Ignatius Gillis died recently at Baddeck, N.S., after a year's illness. Born in Tracadie, N.S., in 1896, the son of Mr. and Mrs. M. K. Gillis, of Sydney Mines, Dr. Gillis was a graduate of St. Francis Xavier and took his medical degree at Dalhousie University (1922). He had been practising in Baddeck for the past fifteen years. He is survived by his widow; his father and mother, Mr. and Mrs. M. K. Gillis, of Sydney Mines; by his daughter, Frances; and by four brothers and a sister. Active in the life of the community, he was a member of the Baddeck Board of Trade, the Bras d'Or Yacht Club, and the Cape Breton Medical Society.

Dr. Duncan Gow, aged 77, former Calgary medical health officer, died at his home on January 12, 1938. He was a resident of Calgary since 1904.

From 1923 to 1933, Dr. Gow was city health officer, retiring four years ago to devote himself to private practice.

Born at Wallacetown, Ont., Dr. Gow graduated in medicine from Trinity University, Toronto (1883), when 21 years old. After post-graduate work in London and Edinburgh Universities, he returned to Canada to practise his profession at Cardinal, Ont.

Dr. Charles James Hamilton, of Cornwall, Ont., died on December 19, 1937. He had practised in Cornwall for fifty-eight years.

Dr. Hamilton was born in Goderich, Ont., on September 15, 1855, a son of Dr. Morgan James Hamilton, one of the early settlers in Huron County. He received his early education in the common schools at Goderich, graduated from the Grammar School, and for three years studied as a druggist. In 1875 he entered University of Toronto as a student in medicine, and graduated M.B. in 1879. For a short time he remained with his stepfather, Dr. G. C. Shannon, of Goderich, and then withdrew in favour of his half-brother, the late Dr. John R. Shannon. He came to Cornwall and entered partnership with Dr. J. J. Dickinson on November 27, 1879, and remained with Dr. Dickinson until the latter's death in 1884, when Dr. Hamilton opened an office in his own name, which he continued until recently.

Dr. Hamilton served Cornwall as Councillor, Reeve, Deputy Reeve and Mayor, being in the Chief Magistrate's seat in 1889 and again in 1894. For many years he was a member of the Board of Public School Trustees. He was still a member for the 1937-38 term. He was Conservative member of Parliament for Stormont from October, 1925 to July, 1926. He had been Coroner for this district for almost fifty years and for fifty-two years was divisional surgeon for the former Grand Trunk Railway and present Canadian National Railways, for the territory from Aultsville, Ont., to Coteau, Que.

Dr. Hamilton was twice married, first to Harriet Sara Dickinson, eldest daughter of Dr. J. J. Dickinson. Of that union five sons were born, Charles Reginald, Clarence Dickinson, Ernest Patrick, George Carroll Shannon, Maurice Cayley all of whom are deceased except Charles Reginald, who is at home. C. D. Hamilton and M. C. Hamilton both became doctors,

the former giving up his life after four years' service in the Great War. Their mother died June 20, 1897.

Dr. Hamilton's second wife was Helen Cline, a daughter of Samuel Cline, a pioneer Cornwall merchant. She died May 15, 1937.

Dr. Jean Jacques Lamontagne, of Montreal, died on December 23, 1937, in his twenty-ninth year. He was the son of Dr. Aimé Lamontagne, born in Montreal, and a graduate of the University of Montreal (M.D., 1932). He had been on the staff of St. Luke's Hospital, Montreal, for the past five years.

Dr. Albert Laramee, of Montreal, librarian at the Faculty of Medicine, University of Montreal, died about November 21, 1937. He was a graduate of the University of Montreal (M.D., 1897).

Dr. A. E. McRitchie died recently in Union Hospital at Indian Head from staphylococcus septicæmia.

Dr. McRitchie was born in Kent county, Ont., 48 years ago. In 1912 the family moved to Zealandia, Sask. Dr. McRitchie attended Western University, London, Ont., where he graduated in medicine in 1911, and then took a post-graduate course in eye, ear, nose and throat in Los Angeles, returning to Saskatchewan later to open a practice. About ten years ago he established himself at Qu'Appelle and developed an extensive practice, being also M.O.H. for the town of Qu'Appelle and the rural municipality of South Qu'Appelle. He had taken a prominent part in the public welfare work at Qu'Appelle during the past years, was a member of the high school board, member of the A.F. and A.M., I.O.O.F. and the United church.

Dr. McRitchie is survived by his widow; two sons, Donald, taking his first year medicine at Winnipeg, and Bobbie at home; his mother; four brothers and one sister at Zealandia.

Dr. Charles Olivier Milot, of Montreal, died during the last week of November, 1937. He was born in 1892 and a graduate of the University of Montreal (M.D., 1922).

Dr. William Ernest Nelson, of Montreal, died on January 13, 1938, in his fifty-eighth year. Born in Montreal, a son of the late William John Nelson and Mary Jane Irvine, Dr. Nelson was educated at Montreal High School and McGill University, graduating M.D., C.M. in 1903.

At the outbreak of the Great War he was medical officer of the Grenadier Guards. Later he served overseas with No. 2 Canadian General Hospital. He was invalided home in 1917 and resumed his practice in the city.

Dr. Nelson was twice married, his first wife dying while he was overseas. He is survived by his second wife, the former Edith Alice Jamieson; one son, William John Nelson; and one daughter, Miss Marjorie Nelson.

Dr. Edwin Kendall Richardson, of Toronto, homœopathic physician, died on January 4, 1938. Born at Flesherton, he was the only son of the late Matthew K. Richardson, M.P. He was a graduate of the University of Toronto (1895), physician for the I.O.O.F., and a Major of the 9th Battery, C.F.A. He was well known in professional, military and musical affairs.

Dr. Edouard Rose, of Montreal, died on December 9, 1937. He was born at Ste. Philomène, Que., in 1852, and began practice in Montreal in 1904. Dr. Rose was educated at Ste. Therèse Seminary and graduated in medicine from the Faculty of Medicine of Bishops University (1874). He first practised for two years in Chateaugay, N.Y., afterwards moving to St. Anicet, Huntingdon County. After practising medicine there for 28 years he came to Montreal and established himself in the district around St. Henri ward.

Dr. John Steele Smith, of Edmonton, Alta., passed away on January 2, 1938, from heart failure. He was a graduate of Glasgow University (1900). After taking his F.R.C.S. at Edinburgh, he decided to come to Canada, and settled in Saskatchewan, where he registered in 1916. In 1918 he decided to live in Alberta and registered there, practising first at Edgerton, then moving to Edmonton. He was senior officer in the Legion of Frontiersmen and past-president of the Edmonton Burns Club. As a medical practitioner he enjoyed the confidence of a large clientèle. He is survived by his widow, three daughters and one son.

Dr. Joseph Eugène Turcot, of St. Hyacinthe, Que., died on December 11, 1937, in his eighty-eighth year. He was born in St. Hyacinthe, the son of Dr. Magloire Turcot. He was a graduate of Laval University, Quebec (1875) and had been in practice in St. Hyacinthe for more than fifty years. He was one of the founders of St. Charles Hospital, St. Hyacinthe, and for a number of years was its chief surgeon. Dr. Turcot was a Knight of the Order of St. Gregory.

Dr. Henri Romeo Vallée, of Montreal, died on or about January 15, 1938. He was born in 1895, the son of the late Napoleon Vallée, and was educated at the College of Montreal and the University of Montreal (M.D., 1918). He was on the staff of the Lachine General Hospital, St. Joseph's Hospital, Lachine, and the Ste. Jeanne D'Arc Hospital, Montreal.

Dr. Douglas Wallace died in the Winnipeg General Hospital on December 23, 1937, aged 53. Born in Fifeshire, Scotland, he came to Winnipeg as a boy with his parents, and received his medical education in the Manitoba Medical College, graduating M.D. in 1913. He practised at Swan Lake, Man., until the Great War, when he went overseas as M.O. with the 181st Battalion C.E.F. On returning to Winnipeg he established a practice in East Kildonan and for a time was health officer of that municipality. He was also a former chairman of East Kildonan School Board and president of the Home and School Association. He served for three years as medical officer of the Canadian Pension Board and in that capacity travelled widely through the west. He is survived by his widow and three daughters. Dr. Maxwell Wallace, of Emerson, Man., is a brother.

News Items

Great Britain

A question asked in the British House of Commons reveals that the Canadian investigations on the subject of the possible prevention of silicosis by the admixture of aluminum with silica dust are being followed with interest by the special committee advising the Medical Research Council on this subject, and already some experiments along similar lines have been initiated in England.

Alberta

A Provincial Society for the Control of Cancer is being organized in Alberta. The Chairman of the Cancer Committee of the Provincial Medical Association, Dr. M. R. Bow, Deputy Minister of Health, resigned owing to pressure of departmental work, and Dr. W. H. McGuffin, of Calgary, was unanimously elected by the Board of Directors to fill his place. It

is expected that there will be nine District Associations, and six or eight local societies. The first steps being taken are to appoint a provisional provincial executive committee to get the work under way. An announcement in this regard will be made shortly.

The town of Lacombe has just opened a new hospital of twenty-bed capacity, which will serve a rural district as well as the town. An additional doctor has been added to the staff, making five in all now in the town.

Red Deer has honoured itself and the medical profession by electing at the head of the polls, Dr. C. R. Bunn, as Alderman for 1938. Dr. Bunn is President-elect of the Canadian Medical Association, Alberta Division.

Alberta registered fifty members last year, which is 50 per cent more than the average number for the previous ten years. A number of these are now in Great Britain taking post-graduate work. The average number of active practitioners in Alberta has not varied by fifteen in fifteen years.

For many years the College of Physicians and Surgeons has been making grants to the Alberta University Medical library, in the hope that the physicians outside the City of Edmonton would avail themselves of the free use of the books. It regrets that few avail themselves of this opportunity, apparently preferring to buy their books and get their journals direct.

There are vacancies for physicians in the following towns: Paradise Valley, Heinsberg, Delia, Craigmyle, Onoway, Waskatenau, Ferintosh and Forestburg. There are other places available, on the purchase of the present practitioner's residence. G. E. LEARMONTH

British Columbia

A new wing in the Enderby General Hospital was formally opened recently, which practically doubles its accommodation.

Two Vancouver nurses left on December 16, 1937, to open a six-bed hospital to be operated by the Canadian Red Cross at McBride, a town of 300, which is the centre of a large ranching and farming area, half way between Prince George and Jasper. A finely built home with stone foundations, cement floors, full plumbing, and large heating plant has been acquired for the hospital. Its owners were forced to leave McBride on account of the rigorous climate. The hospital was opened to patients on January 1, 1938.

Two other Vancouver nurses have left to open a new hospital for the Canadian Red Cross Society at Kyuquot. Kyuquot is a fishing village with a population of 150 situated on the wet and rocky west coast of Vancouver Island. It has a school with 15 pupils and a government radio-telephone station, and is served by a steamer from Victoria and Vancouver making three trips a month. The new hospital will have five beds, combination case-room and surgery, necessary domestic offices, and nurses' quarters.

Dr. H. E. Young, Provincial Health Officer, at a special meeting of the Vancouver Metropolitan Health Board has stated that a special act officially establishing the board will be introduced at the next session of the Legislature.

Dr. G. F. Amyot, who has held the position of advisor on hospital services and assistant to the Provincial Health Officer since January, 1936, has resigned to accept a position as assistant to Dr. Carl Buck, field director of the American Public Health Association. Dr. Amyot has been replaced by Dr. J. S. Cull, who has been for a short time director of one of the units of the Vancouver Metropolitan Health Board.

According to the press, it has been announced by the Hon. G. M. Weir, Provincial Secretary, that health certificates in connection with marriage may be considered by the government in the next session of the Legislature.

The death occurred recently in England of Dr. R. V. Dolbey, formerly a resident of Victoria and later of Vancouver. Dr. Dolbey, who came to British Columbia after serving in the South African War, was associated with the late Dr. O. M. Jones in Victoria before coming to Vancouver. He went to France with the Expeditionary Force, was for a time a prisoner of war in Germany, served also in the East African campaign in Tanganyika, and was twice mentioned in despatches. In 1919 he was appointed to the Chair of Surgery at Cairo School of Medicine, where he remained until a few years ago, when he returned to private practice in London.

An amendment to the Chiropody Act which would have given chiropodists the right to use the prefix "Dr." and follow the name with "chiropodist" was defeated on the second reading in the last session of the provincial Legislature.

Masseurs and physiotherapists in British Columbia will be licensed under the Naturopathic Physicians Act, according to a decision of the Legislature. The amendment of the Act was passed by a vote of nineteen to thirteen. The amendment was opposed under the leadership of Dr. J. J. Gillis, Liberal member for Yale, and Dr. F. P. Patterson, of Vancouver, leader of the opposition. All members of the government present at the time joined with all the Conservatives in opposing the amendment. D. E. H. CLEVELAND

Manitoba

The regular meeting of the Obstetrical and Gynæcological Section of the Winnipeg Medical Society was held in the Medical Arts Club Rooms on November 30th. Dr. F. G. McGuinness gave an address on "The new classification of the bony pelvis and its clinical significance". Dr. Digby Wheeler showed x-ray films illustrating the various types of pelves and also demonstrated a method by which the measurements of the bony pelvis and of the fetal head could be accurately estimated.

On January 12th Dr. J. McG. Lederman read a paper on "Pathological findings in eclampsia". Lantern slides of photomicrographs were shown.

Dr. Oliver S. Waugh was elected chairman of the Honorary Attending Staff of the Winnipeg General Hospital at the recent annual meeting of the staff.

ROSS MITCHELL

New Brunswick

Lieut.-Governor Murray MacLaren recently was host at a dinner to some forty-five members of No. 8 Bearer Company at Government House. This Company, which was later converted into a field ambulance, was the first medical unit recruited in New Brunswick. It was organized and recruited by Governor MacLaren, with headquarters in Saint John. Among those attending the dinner were several from out-of-town points.

Dr. H. A. Farris was re-elected President of the Saint John Anti-Tuberculosis Association.

Dr. B. W. Robertson, of Keswick Ridge, was elected as Warden of York County in January. Dr. Robertson has a record of many years' service to his municipality.

At the annual meeting of the New Brunswick Division of the Canadian Red Cross, Dr. L. DeV. Chipman, Saint John, was elected President. The Red Cross intends in 1938 to conduct a complete survey of physically handicapped children in the Province of New Brunswick.

Dr. Ronald W. Irving, a graduate of medicine of the University of Edinburgh of 1936, has established practice in the City of Moncton after a year of post-graduate study in England and Ireland.

Lieut.-Col. C. M. Pratt and Major A. S. Kirkland, R.C.A.M.C., were granted the efficiency decoration by Royal warrant, according to recent militia orders.

Dr. J. S. Hynes has been appointed full-time Radiologist at the Fredericton Victoria Public Hospital.

At the time of annual appointments to the staff of the Saint John General Hospital in December it was noted that arrangements have been made to subdivide the out-patient medical clinics, with a rearrangement of staff to provide for separate clinics in Dermatology, Hæmatology, Allergy, Cardiovascular Diseases and Diabetes. The hospital was recently the recipient of an anonymous gift to be used for the purchase of an orthodiascope which has recently been installed. This gift was made available through the good offices of Dr. H. A. Farris. A. S. KIRKLAND

Nova Scotia

In the highlands of northern Cape Breton are two thousand people without medical aid, cut off from the rest of Nova Scotia, their only highway, the famed Cabot trail, buried beneath great drifts of snow. Father Paul MacNeil, the parish priest, had sent out calls for assistance, while three persons lie seriously ill of what is thought to be pneumonia. Attempts to reach them by road have failed, but the flight of a doctor from Sydney by plane will probably bring relief to the present situation. The Provincial Department of Health is making efforts to have a practitioner settle there, but the rigors of the life and the poverty of the inhabitants make the practice unattractive for any one unless endowed with an ardent missionary spirit.

It was reported at the annual meeting at Pictou that the Sutherland Memorial Hospital showed a credit balance of more than $1,500 for the year 1937. The 306 patients admitted during the year represented an increase of 37 over the previous year, and, of the $12,000 in total receipts, $7,000 were from fees.

An eight-hour day for the nurses of the Aberdeen Hospital, New Glasgow, was the subject of a resolution recently passed by the local members of the United Mine Workers and steelworkers unions. The matter was considered by the executive of the board of trustees of the hospital and will probably be taken up at the annual meeting.

The Halifax press wallowed happily in a discussion between prominent medical men and the city Board of Health over the diphtheria situation. The appearance of a few cases recently brought from medical men the criticism that the Board of Health has apparently not been doing its part in advocating immunization. The Board replied sharply that three cases did not constitute an epidemic; that there was no immediate need for immunization; that there had been death in the southern United States from immunization (seven years ago, following administration of toxin-antitoxin). The day following this statement more than 150 children appeared at the immunization clinic of the Public Health Centre. Following a meeting with a committee from the Halifax Medical Society, the Board of Health made an official pronouncement in which it approved of and recommended diphtheria immunization. Regulations were set forth whereby it is to be carried out only at the request of the child's parent or guardian: there is to be no compulsion. Those who can afford to must pay for the procedure. The toxoid of the Connaught Laboratories is to be used. Following this publicity it is to be hoped that Halifax will move up with the rest of the province in the percentage of its children protected against diphtheria.

Captain F. B. Day, M.D., of Thorburn, was elected president of Branch 34, Canadian Legion, B.E.S.L., at the annual meeting at New Glasgow.

The ranks of the registered nurses in Nova Scotia were swelled by forty-five recently, with the announcement of results in the annual provincial registration examinations.

Dr. G. W. T. Farish was elected director and representative of the medical staff at the annual meeting of the Board of the Yarmouth Hospital.

Sir James Barrie, His Life and Works, was the topic on which Dr. D. H. Chisholm addressed the Pictou county branch of the Registered Nurses' Association.

Small-pox reared its head in the upper Stewiacke district, where several cases developed in the Cross Roads school. The school, which has an enrolment of 25, was immediately closed by the county board of health. Measures are being taken to prevent the spread of the disease and vaccine is in demand. It was found that a very small percentage of the children in the district had been vaccinated.

Reports of the school nurses to the Halifax Board of School Commissioners for the 1937 term showed that, out of 7,810 pupils weighed and questioned, 1,920 were found to have physical defects.

ARTHUR L. MURPHY

Ontario

At an examination held at Toronto, October 7, 1937, the undermentioned officers qualified for the rank of Lieutenant-Colonel, R.C.A.M.C. (N.P.): Majors W. W. Barraclough, J. D. H. W. Barnett, G. R. D. Farmer, N. F. W. Graham, M. G. Brown, M.C., A. T. Eaton, A. E. MacDonald, J. P. Fawcett.

A $100,000 building project is being undertaken next year in connection with the General Hospital at Chatham. The present hospital is now taxed beyond its capacity.

The city of London, as a result of the action of the ratepayers at their recent municipal election, will shortly start on a $400,000 addition to the Victoria Hospital.

Dr. Arthur Powers, formerly of Rockland, Ont., for two years resident physician at the Royal Ottawa Sanatorium, and more recently with the Ontario Travelling Chest Clinic, has been appointed in charge

of the new Hull Sanatorium for Tuberculosis, which has just recently been opened.

Dr. D. W. Smith, late M.P. for Dufferin-Simcoe, has been appointed to the Department of Health in the Division of Mental Diseases. Dr. Smith is at present attached to the Ontario Hospital at Whitby, where he is serving as Assistant Superintendent.

The Sisters of St. John the Divine, who were pioneers in medical nursing in Canada and are now carrying on a hospital in the diocese of Toronto, are considering the establishment of a hospital in Western Ontario. Bishop Seager, of the Synod of Huron, has been requested to appoint a committee to investigate the possibilities of this project.

In the recent report of the Medical Officer of Health for Toronto to his Board it was stated that the epidemic of poliomyelitis during the summer and autumn months of 1937 is definitely ended. The records show 748 resident cases with only 30 fatal terminations. The epidemic left in its wake 226 known persons (183 in homes and 43 in hospitals) requiring some form of after-treatment or follow-up care. This includes all cases, from those with slightly weakened muscles to those with extensive paralysis. Two specially qualified physiotherapists have been engaged for district work, to instruct those taking care of the patients with regard to proper procedure in the way of massage.

The new convalescent wing of the Hastings Memorial Hospital (municipal hospital) opened on December 3rd, with 26 admissions of all ages, subsequently increased to 33 admissions.

At a recent meeting of the London Academy of Medicine addresses were given by Prof. William Boyd, of the Department of Pathology, University of Toronto, on the subject, "Diffuse glomerulo-nephritis", and by Dr. Kenneth McKenzie, of Toronto, on "Trauma of the brain and skull".

The Hippocratic Society of the University of Western Ontario, held its annual banquet on December 10th, with Dr. Gordon C. Heyd, of New York, Past President of the American Medical Association, as guest speaker. J. H. ELLIOTT

Quebec

Dr. Edward W. Archibald, formerly Head of the Department of Surgery at McGill University and the Royal Victoria Hospital, Montreal, was signally honoured on January 11th, when he was formally presented with the honorary degree of Doctor of Medicine of the University of Paris. This degree was granted him last fall, but owing to urgent professional matters, Doctor Archibald was unable to go to Paris at that time.

The ceremony of presentation took place in the building of the Arts Faculty of McGill, and the new Minister of France to Canada, Comte Robert de Dampierre, visited the University expressly to take part.

The Minister for France was welcomed to the University by Dr. Lewis Williams Douglas, principal and vice-chancellor. Dr. Archibald was then presented to Comte Robert de Dampierre, who in a brief address lauded the achievements of the famous Montreal surgeon. After testifying to the high place which Dr. Archibald has attained in surgical science, the French Minister to Canada formally presented the honorary degree in these words: "I have the very great honour to present to you the degree of Doctor of Medicine of the University of Paris, which is described as the mother of universities in Europe."

Dr. Douglas, in introducing Dr. Archibald to Comte de Dampierre, pointed out that this was a very unique occasion. Present to do honour to Dr. Archibald were the representatives of a great power, France, and of the University of Montreal, the City of Montreal and McGill University. Dr. Archibald's fame as a surgeon was world-wide, but particularly for his breadth of vision, broad culture and spirit of human kindliness, it was his great pleasure to introduce him for this high honour.

J. W. McConnell, a governor of McGill University and warm friend of Dr. Archibald, was present at the ceremony, and with him was Hon. Herbert A. Bruce, formerly Lieutenant-Governor of the Province of Ontario.

The French Minister was accompanied by M. René Turck, French Consul General in Montreal, and by attachés of the legation and consulate staffs. Present at the ceremony were representatives of the University of Montreal, including Msgr. Olivier Maurault, rector; Dr. Adelard Groulx, director of the civic Department of Health; Dr. A. Grant Fleming, dean of the McGill medical faculty, and Prof. J. C. Simpson, associate dean; Prof. René du Roure, head of the department of French at McGill, and others. Among others present from the University of Montreal, in addition to the rector, were Dr. Theo. Parizeau, dean of the faculty of Medicine, Dr. Donald Hingston, and Dr. B. G. Bourgeois.

McGill representatives included Dr. W. W. Chipman, and Dr. C. F. Martin, governors; Dean Charles Hendel of the Faculty of Arts, Dean J. J. O'Neill of Science, Dean Ernest Brown of Engineering, Dr. J. C. Meakins, head of the department of medicine, Dr. A. T. Bazin, professor of surgery; Dr. E. M. Eberts, Dr. Wilder Penfield, Dr. J. R. Fraser, Prof. C. M. McKergow, Mrs. W. L. Grant, warden of Royal Victoria College, Professor Murray, Dr. Owen Stredder, bursar and secretary, T. H. Matthews, registrar, and Col. Wilfrid Bovey.

Saskatchewan

The twentieth anniversary of the first sanatorium in the province was celebrated by the Saskatchewan Anti-Tuberculosis League recently. Messages of congratulation and good wishes came to Dr. R. G. Ferguson, General Superintendent, from all parts of Canada as well as Saskatchewan. Newspapers, both daily and weekly, swelled the chorus and told again the story of Saskatchewan's fight against tuberculosis. The entire province took up the idea, and approximately two hundred towns organized celebrations which took the form of dances at which special speakers briefly referred to the salient points of the campaign, and made a special appeal for the Christmas Seal Fund.

The twenty-year period which was brought to a close in such dramatic fashion is one in which any tuberculosis association could well take pride, and whose record of accomplishment few could equal. Opening its first sanatorium at Fort Qu'Appelle on October 10, 1917, the Saskatchewan Anti-Tuberculosis League went from this beginning to an expansion to 310 beds at Fort Qu'Appelle, a 175-bed sanatorium opened at Saskatoon in 1925, and a 276-bed sanatorium opened at Prince Albert in 1930. Beside the daily clinics at the three sanatoria, clinics are held twice a week at Regina, weekly at Moose Jaw, and, monthly, in six other urban centres. Arrangements for financing treatment began in 1922 with rural pools, extended later to urban pools, and blossomed in 1929 to free treatment for all bona fide Saskatchewan residents. The clinics of course are also free, financed by Christmas Seals.

Dr. R. O. Davidson has made the following statement in regard to maternity grants.

"The maternity grant will be in effect over the whole province as formerly. In the relief areas the gratuity to the mother is still to be paid, but effective September 1, 1937, the gratuity to the physicians for attendance at confinement will not be paid. The reason for this is that the relief medical services plan includes obstetrical care for which the physicians are receiving monthly grants.

"If the gratuities were paid to physicians in the relief areas, the amounts would have to be considered as cash receipts and deducted from the monthly relief medical grant. This would entail much unnecessary clerical work, with no benefit to the physician.

"The gratuities to physicians for completing the pre-natal and post-natal forms will still be paid in the relief areas."

Dr. C. O. Banting, of the Prince Albert Sanatorium, was recently transferred to the Sanatorium at Fort San. Dr. I. C. Molony, of the Sanatorium at Fort San, has taken Dr. Banting's place at Prince Albert. Dr. John Orr, of Moose Jaw, who has had the chest clinics at Swift Current, Regina and Moose Jaw has been transferred to Fort San. Dr. Charles Bennett, of Fort San, has been transferred to Moose Jaw. Dr. Gordon Townsend has returned from overseas, where he studied at Cardiff, Wales. He takes over the children's pavilion and orthopædic cases at Fort San. Dr. A. R. McPherson, of the Sanatorium staff of Prince Albert, has left for England where he will take a six months' post-graduate course.

Dr. J. E. LeBlond, recently of Rosthern, has opened up a general practice in Prince Albert.

The health committee of the Regina City Council has asked Dr. Walton, the M.O.H. to arrange with the Medical Society for the appointment of a committee to confer with them in regard to health insurance for the small-wage earner.

Dr. F. Z. Paulson, a former intern at the Grey Nun's Hospital, has returned to Regina to start practice. He was born at Aberdeen, Sask., and went to high school in Prince Albert and Saskatoon. He took his Bachelor of Science degree from the University of Saskatchewan and his Doctor of Medicine from the University of Manitoba in 1934. During the past two years he has practised in the Colgate district.

Radium from the Eldorado refinery at Port Hope, Ont., will be supplied to the Saskatchewan cancer commission at Saskatoon to replace a missing needle of the precious material, lost several months ago. The new supply is being provided by the insurance company which carried the policy, and does not cost the government anything. It is estimated that its value will be approximately $4,000. LILLIAN A. CHASE

General

Prof. E. V. McCollum, of Johns Hopkins University, is being brought to Canada under the auspices of the Committee on Nutrition of the Canadian Medical Association, who have arranged for his appearance in the Capital City on Saturday, February 19th, which is the last day of the Conference on Medical Research. The Department of Pensions and National Health is also assembling on that day in Ottawa a Nutritional Committee composed of the sub-committee on Nutrition of the Dominion Council of Health and the Scientific Advisory Committee to this Council on Nutrition, comprising five members, making a total of ten.

It has been arranged to have Professor McCollum address the Canadian Club at luncheon, and he is to broadcast over a trans-Canada hook-up from 8.00 to 8.15 p.m. He will also address a public meeting after 8.30 p.m. The ten men who are being assembled and who are associated with the Dominion Council of Health will draw up agenda for consideration of the Canadian Council on Nutrition, which, it is expected, will meet in Ottawa during Easter week.

The American Physicians' Art Association, a national organization of medical men who have ability in the fine arts, will hold a first national exhibition in the San Francisco Museum of Art, San Francisco, California, in June, 1938. (The American Medical Association Convention is on June 13th-17th in the same city). The American Physicians' Art Association already has an outstanding membership. There are three classifications for membership: active, associate, and contributing. The first annual exhibition promises to be of unusual interest with entries to be accepted (after jury selection) in the following classifications: oils, watercolours, sculpture, photography, pastels, etchings, crayon and pen and ink drawings (including cartoons), wood carvings and book bindings. Scientific medical art work will not be accepted. The exhibition is not limited to first showings. All entries close April 1, 1938. Any physician interested should communicate at once with the Secretary of the American Physicians' Art Association, Suite 521-536 Flood Bldg., San Francisco, California.

The XVIth International Physiological Congress will be held in Zürich, Switzerland, August 14 to 18, 1938. All members of the Canadian Physiological Society are eligible to attend and participate in the program.

The International Congress Committee has ruled that it will "accept applications for demonstrations and communications only through National Committees," and has asked the Society to appoint a Canadian Committee to collaborate in the arrangement of the program. The Council of the Canadian Physiological Society has agreed to act as the Canadian Committee, and will be glad to arrange for the acceptance of papers in appropriate fields from members of the Society, or other Canadians.

The Council has agreed on the following conditions for the acceptance of papers: A member may have a paper or demonstration accepted if it is approved by the head of his department, provided the latter is a member of the Society. If the head of the department is not a member, the paper will be accepted if it is approved by a member of the Council. Applications from non-members will be considered also, provided the Council is satisfied that they are eligible for membership in the International Congress. The Council can not undertake to accept more than one paper from any one applicant.

The Secretary has a supply of circulars and cards for making application for membership in the Congress. These may be had by members on application. G. H. Ettinger, Secretary.

The German Society for Investigation of the Circulation will meet on March 26th and 27th at Bad Nauheim, Germany. The chief topic for discussion will be "Collapse of the circulation". All information can be obtained from Prof. Dr. Eb. Koch, Kerckhoff Institute, Bad Nauheim.

Amateur and professional Minnie-Cam. photographers will be gratified to learn that the Jury of the International Exhibition in Paris, 1937, awarded

the firm of Zeiss Ikon AG., Dresden, Germany, two "Grand Prix" for their products in the divisions 14 (photography and cinematography) and 49 (optics). According to information received by the Hughes Owens Co. Ltd., the Canadian distributors, the goods displayed by the Zeiss Ikon at the International Exhibition comprised photographic cameras, sound film reproduction apparatus for ciné theatres and scientific instruments.

Book Reviews

A Method of Anatomy, Descriptive and Deductive. J. C. B. Grant. 650 pp., illust., $6.00. Wm. Wood, Baltimore, 1937.

The standard textbooks of anatomy are as trustworthy and as thrilling as a city directory. This volume is designed to be a record of travel, a journey of exploration through the territory of the human body. It might almost have been entitled, "In Search of Homo Sapiens". An introductory section deals with the meaning of the terms that are employed in the science of anatomy, and the use and care of the simple equipment necessary for practical study. Next there follows a series of chapters covering the Upper Limb, the Abdomen, the Pelvis, the Lower Limb, the Thorax, and the Head and Neck. Finally, a short chapter is devoted to miscellaneous features not specially discussed hitherto. The central nervous system is not described.

The simile of the travel-tour may be carried further. No alluring pictorial scenes are presented, but scale maps are provided in plenty. Each one verified by measurements from actual dissections, they bear the same relation to the ordinary diagram that the blue-print bears to the pencil sketch. By their simplicity of line they invite the student to reproduce them, and in so doing to consolidate the knowledge obtained by the use of his own eyes in a way that only diagrams can do.

Two missiles have generally been hurled by those who would diminish the amount of time devoted by the student to the study of anatomy. The first is that mastery of the subject is a pure feat of memory. The second is that the detail is too voluminous ever to be remembered, and that since a sense of proportion between the important and relatively unimportant is seldom preserved the knowledge so laboriously gained is speedily lost. The first of these objections loses much of its force after one has read a few pages of this book, and is emphatically countered by a perusal of the chapter on the Abdomen. Here, the various viscera are shown to present the relations they do, because in the light of their embryological unfolding they could not possibly do otherwise. A particularly neat illustration is that of the three-leaved book on page 147. In the case of the lower limb the importance of the foot as a kinetic as well as a static mechanism is emphasized. The second objection is sufficiently answered by the fact that the volume runs only to some 600 pages. This alone is sufficient to indicate that the essentials only have been retained, while the non-essentials have been omitted.

A notable feature of the volume is the introduction where possible of "generalizations", such as the fact that muscle cannot play over an unyielding structure and remain muscle, or that although the level at which branches may be given off from a nerve may be variable, the side from which they leave is constant, so that in dissecting a nerve, there is a "side of safety" and a "side of danger". Again, much useful information as to the transmission of strains is demonstrated by reference to the direction of the fibres of ligaments. Function and structure are thus correlated.

It is not too much to say that this is a volume presenting on every page the evidence of an original and singularly attractive approach to a subject which ought to be the most fascinating of all studies. It can be recommended with unqualified approval.

The Pneumonokonioses (Silicosis), Literature and Laws. Book III. G. G. Davis, E. M. Salmonsen and J. L. Earlywine. 1033 pp. Chicago Medical Press, 1937.

In accordance with the plan of the authors enunciated in 1933, Book III contains abstracts of publications on pneumonokoniosis appearing in the literature for 1935 and 1936. In these abstracts essential data are presented concisely but in a form adequate for understanding and sustained interest. As a new feature a medical index is included, which will commend itself to medical practitioners in industrial areas, *e.g.*, there are 29 references under the heading of "animal experimentation" on the subject; papers on differential diagnosis, clinics, post-mortem findings, pneumoconiosis by trades, etc., are listed. A valuable service is rendered to those interested and especially to workers in this field by the translations involved, the opportunity presented to rapidly separate material of a general from that of a specific nature, and the knowledge that no reference of any account is omitted. The second part of the volume contains extracts from Workmen's Compensation and Factory Acts, bearing upon employers' liability for occupational diseases in the states of the United States and in the Provinces of Canada.

Apart from its value as a reference in finding one's way through a voluminous literature on the group of dust-diseases, this book can be read from page to page with interest and help.

British Encyclopædia of Medical Practice. Edited by Sir Humphry Rolleston, Bt. Vol. 4. 600 pp., illust., $10.00 a vol. Butterworth, Toronto, 1937.

This volume begins with the subject of Diarrhœa, treated by Sir Arthur Hurst, and this is amplified by three other articles on various forms of this disease. The chapter on Eczema does not give the prominence to allergy as a causative factor which one would be apt to find in writings on this side of the Atlantic. But still the subject is adequately covered. The article on Disseminated Sclerosis by Dr. F. M. R. Walshe is masterly in its clear presentation. We find no sign of the encyclopædia failing to fulfil its promise of usefulness.

Diseases of the Nervous System in Infancy, Childhood and Adolescence. F. R. Ford. 953 pp., illust., $8.50. C. C. Thomas, Springfield, 1937.

The neurology of childhood is still in an early stage of development. Even the common neurological disorders of this period are to a great extent obscure. The author in this book has brought together all the available information about these conditions in an effort to clarify, in part at least, the present situation. Included are all the conditions which occur in childhood, not merely those which are peculiar to childhood. The neurological complications of diseases not primarily neurological are also given, with a brief discussion of the general aspects of the disease.

In contrast to the customary purely anatomical classification of diseases of the nervous system a pleasing change has been introduced. The grouping of diseases has been based primarily upon etiology with due regard to clinical characteristics. The clinical description of each condition is presented with a brief discussion of pathological anatomy, diagnosis, prognosis and established principles of treatment.

Appended to the description of each disease is a short bibliography. In this, care has been taken to select those references which have been written in English and will be found to be most easily available.

The book is profusely illustrated and the author has in addition presented a number of case histories which help greatly in emphasizing particular features. It will be found to be a most valuable aid to both neurologist and pædiatrician.

Operative Obstetrics. J. M. Kerr, LL.D., M.D., F.C.O.G., with the assistance of Donald McIntyre, M.D., F.C.O.G. and D. F. Anderson, M.D., University of Glasgow. 4th ed., 847 pp., illust., $13.50. Macmillan Co., Toronto, 1937.

The subtitle to this book, "A Guide to the difficulties and Complications of Obstetric Practice" gives a much better idea of its aim and scope. It is the sort of book that the new graduate should add to his library, since it not only covers the indications for and the technique of every manœuvre necessary to the obstetric art, but is the work of perhaps the most outstanding British obstetrician. As is to be expected of a book coming from Glasgow, its section on Disproportion is in the first rank. Munro Kerr has taken a stand, which this section reflects, against the excessive induction of premature labour, which has been British practice for so long, and favours the trial of labour in doubtful cases, which is the practice on this continent. In the treatment of the persistent occipito-posterior position, however, he favours manual rotation, and claims a higher success for it than most of us who have tried it have been able to attain, and dismisses rather curtly such forceps techniques as the Melhado manœuvre, and does not mention De Lee's key-and-lock procedure, with which so many of us have succeeded where the manual method has failed.

As regards accouchement forcé one does not find the condemnation of it that it surely merits, not only is the Bossi method of dilatation of the cervix described but a cut is shown of the truly barbarous instrument with which it is produced. Nor does Dr. Kerr take the clear stand against the employment of high forceps that one would like to see in such a volume. Granted, that in hands like his the operation may be devoid of grave risk, nevertheless in less skilled hands it is responsible for much fetal death and maternal damage. While the chapter on the Induction of Abortion contains considerable valuable argument *re* its indications, there is no section on sterilization, and this is mentioned only as an operation that should be undertaken after not more than four repeated Cæsarean sections. Nor is corpus luteum hormone mentioned in the treatment of habitual abortion. But these are minor points in a book that everyone doing obstetrics should possess.

The Abdominal Surgery of Children. Sir Lancelot Barrington-Ward, K.C.V.O., Ch.M., F.R.C.S.(Edin.), F.R.C.S.(Eng.). Second ed., 333 pp., illust., $7.50. McAinsh & Co., Toronto, 1937.

The vast experience of the author in surgical diseases of children is reflected in this work. The test of a good medical book is the help it gives a physician or surgeon in referring to it for information on common or rare cases. Especially outstanding are the chapters on hernia, congenital hypertrophy of the pylorus, errors in the development of the intestines, and Hirschsprung's disease. It is obvious that much time has been spent in collecting statistics from the author's own experience as well as a complete bibliography. As a reference work it is most helpful. The book covers the subjects completely and authoritatively. The value of the treatise is impressed on the reviewer by re-reading chapters several times. This outstanding and well written book should be in the library of every practitioner who is interested in the abdominal diseases of children. The binding, paper, type and illustrations, reach the high standard that is expected of the Oxford University Press.

Surgery of the Sympathetic Nervous System. G. E. Gask, C.M.G., D.S.O., F.R.C.S., and J. P. Ross, M.S., F.R.C.S. Second ed., 191 pp., illust., $4.75. Macmillan, Toronto, 1937.

That a second edition of this text has been required within four years of publication of the first is a tribute to the merit of this excellent monograph on a somewhat specialized field of surgery. The general arrangement of this edition is similar to the first, but the sections on Sympathectomy for Disorders of the Circulation and Disorders of the Visceral Motor Mechanism have been considerably expanded. Widened clinical experience has enabled the authors to confirm the merits of sympathectomy in vascular diseases (Raynaud's disease and thrombo-angiitis obliterans) and certain disturbances of visceral motor mechanism, notably Hirschsprung's disease. This little volume is an excellent summary of our present knowledge of sympathetic surgery, and can be unreservedly recommended to all interested in this field.

Practical Proctology. L. A. Buie, A.B., M.D., F.A.C.S. 512 pp., illust., $7.25. McAinsh, Toronto, 1937.

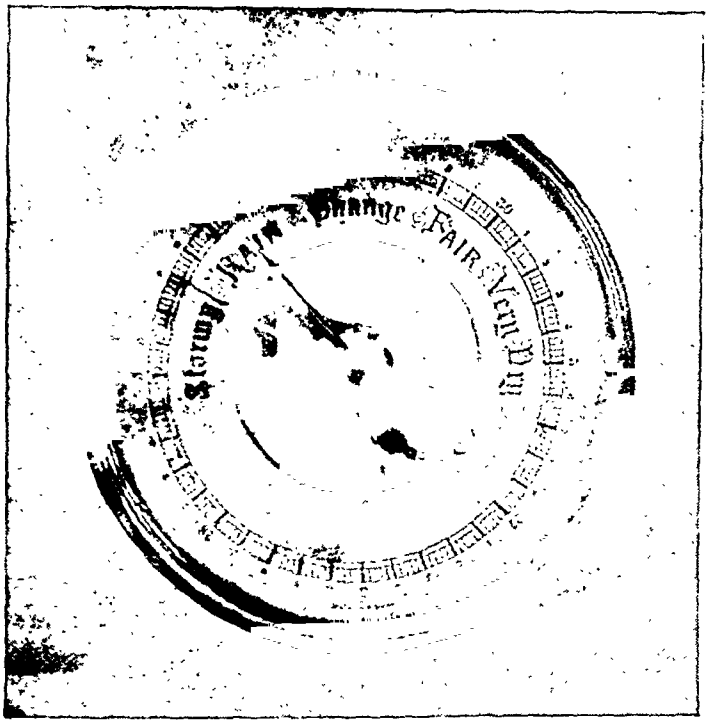
This volume follows a book, "The Colon, Rectum and Anus", by Rankin, Bargen and Buie, of the Mayo Clinic, published in 1932. It, however, confines itself to pure rectal lesions, in which Rankin and Bargen do not collaborate. The work covers rectal diseases and their treatment in a conscientious manner. The illustrations are good and the bibliography is complete. The book presents the views and experience of the author and can be recommended to those seeking a general knowledge of diseases of the rectum and anus.

The Endocrines in Obstetrics and Gynæcology. R. Kurzrok. 488 pp., illust., $7.50. Williams & Wilkins, Baltimore, 1937.

This is probably the best book now available on its subject. It begins with an extensive review of the nature and function of the hormones, especially those directly concerned with reproduction. The author has here been at pains to quote the actual facts obtained from clinical observation and experimental data, with due acknowledgments, and at times one feels that a connecting thread of generalization might have made the recital less jerky, especially where he has concentrated on succinctness. In dealing with topics to which he has himself made significant contributions (and there are not a few of these) he has allowed himself more latitude, without always doing full justice to the findings of others, which becomes unfortunate when (as in the assay of female sex hormones in urine) methods decidedly superior to those employed by the author in his own researches have become known. The second half of the book is devoted to menstrual disorders and other aspects of gynæcological pathology with an endocrine background; judiciously selected cases are discussed in some detail, with admirable logic and exemplary use of the recently-gained physiological knowledge. There are several misspellings, especially of foreign names: "Qugenot and Pouse" is a poor shot at "Guyenot and Ponse". The book is attractively produced, and the microphotographs deserve a special word of praise.

The Avitaminoses. W. H. Eddy, Ph.D. and G. Dalldorf, M.D. 338 pp., $4.50. Williams & Wilkins, Baltimore, 1937.

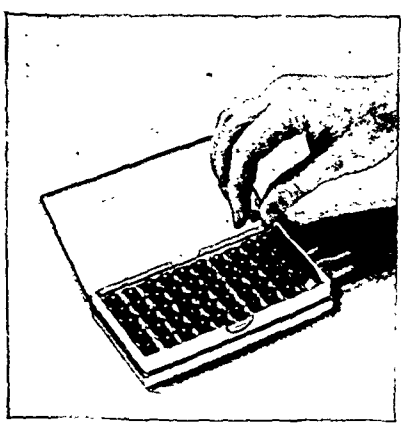
To write a comprehensive and up-to-date monograph on Avitaminosis is, of course, impossible. The subject is too vast to be entirely at the command of one, or even two authors, and much that is up to date today will certainly be out of date tomorrow. The past history of vitamin therapy contains some of the finest examples of empirical medicine at its best; the present presents a panorama of therapeutic possibilities that is almost



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fantastic. In spite of the inherent difficulties of the problem the authors have produced a very readable and useful volume, and one that can be understood by practising physicians. As is inevitable the possibilities of vitamin therapy present a veritable therapeutic fairyland. There is no symptom and few diseases of mankind that are not suspected of being, in some way, related to the classical deficiency diseases. The authors are perhaps a little naive in tentatively accepting clinical evidence to support the conceptions of sub-clinical avitaminoses. There are no doubt many abnormal sensations and even pathological changes that will ultimately be shown to be due to relative deficiency of various vitamins, but except in a few instances the evidence for this is still inconclusive and the plausible blandishments of commercial drug houses must be met with hard clinical research. The authors, of course, do not take the responsibility for clinical claims, and the inclusion of the material does not detract from the interest of the book; however, romance and science do not mix well and in future editions, which will be demanded, a more critical attitude might well be accepted.

Altogether the book is a most creditable product in a difficult field and with its many references constitutes the best source of knowledge on the subject.

Physiological Chemistry of the Bile. H. Sobotka, Chemist to the Mt. Sinai Hospital, New York. 202 pp., $3.00. Williams & Wilkins, Baltimore, 1937.

This book is an attempt to combine in short space the conclusions from a voluminous literature on the physiological, pharmacological and pathological facts concerning bile acids and the other chemical constituents of bile. The bibliography and authors' index appended give an additional 50 pages. The conclusions given are those of the authors cited, with, in many instances, a brief comment by the writer, who hopes to stimulate those particularly interested in biliary disease to deeper and clearer conception of the liver as a secretory organ whose physiological activities have been more ignored than those of any other organ and yet probably are more far-reaching in body economy. The clinical facts are fully modern and justifiably critical. The book is worth reading twice.

A Guide to Medical Case Reporting. Published by the Department of Medicine, McGill University. $0.50. Renouf Pub. Co., Montreal, 1937.

We do not know of any book quite like this. There are many textbooks on physical diagnosis, and they usually have a chapter on history-taking. But what a student wants in taking a case-history is a good working model which he can keep before him. That is provided by this book. It is admirably direct and concise, and it can be carried in the pocket. It contains a section on "Diary Writing" by Dr. G. A. Copping, which is certainly not to be found in the ordinary textbook. Dr. Copping obviously draws on an extensive experience in the training of students to write case reports, and the benefit of this is given in his fresh and pertinent comments. He has instinctively realized that one of the best ways to teach is to point out common errors. Some may object to the order of the case report which calls for the family and personal history before the history of the present illness, but the arguments for either arrangement seem to be equally cogent, and a student will learn by degrees to select whichever suits him best. It is better perhaps that he should be given one systematized plan at first. The Department of Medicine of McGill is to be congratulated on this coordination of its teaching methods.

Physical Diagnosis. D. C. Sutton. 495 pp., illust., $5.75. McAinsh, Toronto, 1937.

This book represents the sifted experience of several years' teaching in the Medical Clinics of Northwestern University, and in the medical wards of the Cook County Hospital. It is clearly written and gives all the modern methods of physical examination. The illustrations are numerous and interesting. There are, however, different ideas as to what illustrations should be used. To the mind of the reviewer there are many which might well have been omitted: *e.g.*, that of cachexia in advanced carcinoma; of extreme inanition; of various stethoscopes; of types of fever; of most of the x-rays of the lungs, particularly one showing "early apical tuberculosis", where the disease is certainly not *early*, and of acromegaly on page 102. Apart from these, we think that the book will be useful.

Maternal Deaths—the Ways to Prevention. I. Galdston, Secretary, Medical Information Bureau, New York Academy of Medicine. 115 pp., $0.75. Commonwealth Fund, New York, 1937.

Dr. B. P. Watson in the Foreword explains that the present volume is an interpretation for the non-medical reader of the studies made by the New York Academy of Medicine and other bodies on maternal mortality. Dr. Galdston, in a simple direct style, presents the nature and extent of the problem; he then indicates the possibilities of prevention, pointing out the patient's contribution as well as the physician's contribution, which are required to solve the problem. The dangers arising out of inadequate care, low standards of hospital service, the abuse of operative procedures, and the dangers associated with the indiscriminate use of anæsthetics are made clear. All this leads up to the concluding section "What can be Done", and here the author stresses public education, the quality and adequacy of facilities, and concludes that "It is possible within the given economic order to effect a very marked reduction in maternal mortality by making more effective use of our knowledge and resources".

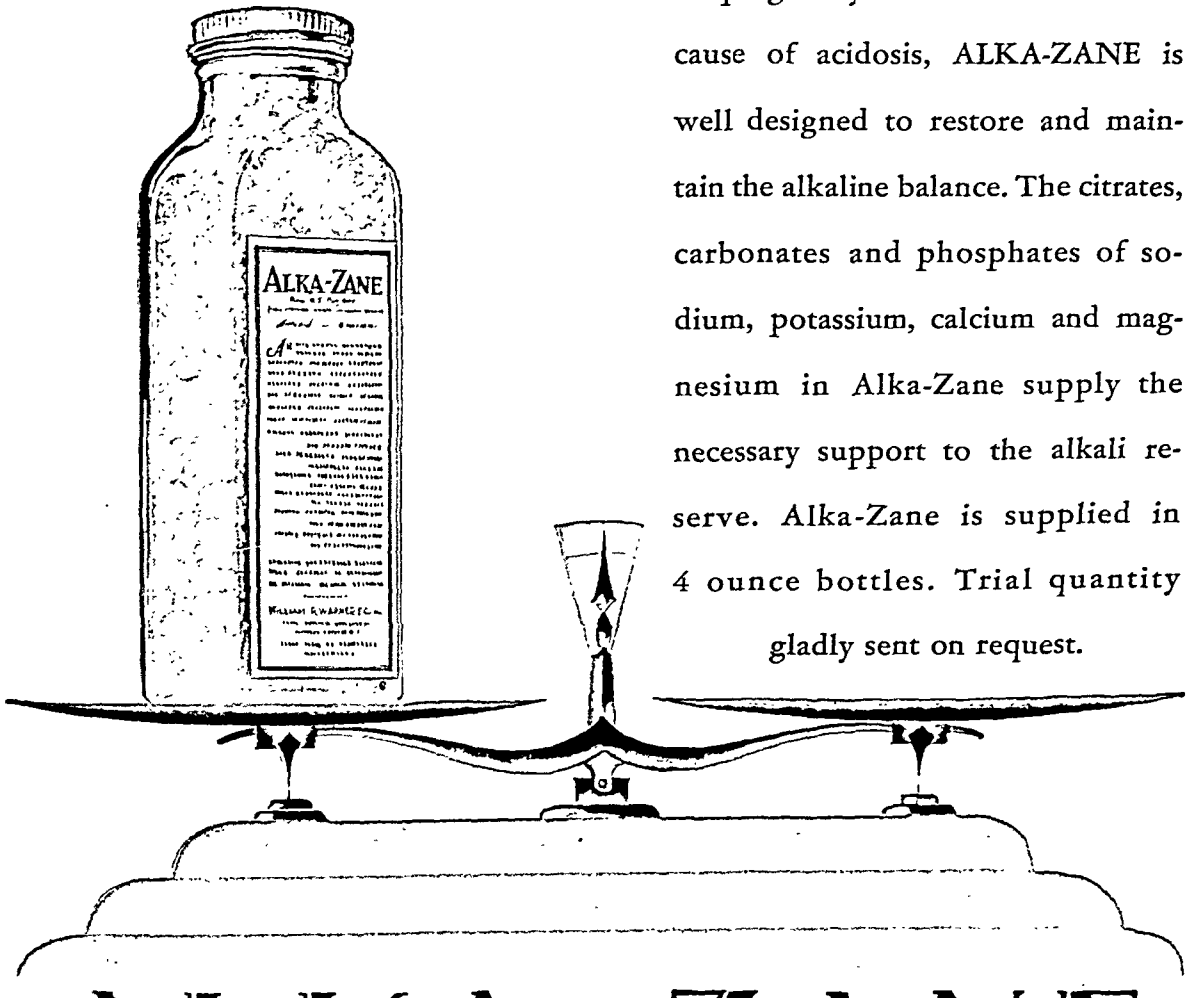
This publication is recommended to the medical practitioner who has not the time to read and digest the original studies which provide the factual material. It could with advantage be read by any intelligent person, providing as it does a logical approach to a subject which is too often dealt with at an emotional level.

Doctors on Horseback: Pioneers of American Medicine. J. T. Flexner. 370 pp., illust., $3.00. Macmillan Co., Toronto, 1937.

This book is a fascinating study. Mr. Flexner writes with the facility of the trained litterateur, which he is. He also has the medical background which his subject demands, for he is the son of Dr. Simon Flexner. Under the circumstances we would expect a finished product and we are not disappointed. The author belongs to the psychoanalytical school of biographers, but not oppressively so. He has taken certain outstanding figures in American Medicine, representing epochs in its development, and has described them and their associates with a sure touch that enables us not only to see them as they doubtless were but at the same time gives us a picture of the times and places in which they moved. We are introduced to John Morgan, William Shippen Jr., and Benjamin Rush, representing the revolutionary and immediate post-revolutionary period. We meet Ephraim McDowell, the first surgeon who was bold enough to open the abdomen and remove an ovarian cyst. We get a graphic description of the operation and its later consequences. We meet Daniel Drake, the pioneer medical man of the Ohio Valley, the founder of medical schools. We meet William Beaumont, the first experimental physiologist of importance since Harvey. We are told the story of the introduction of sulphuric ether as an anæsthetic, of the controversy as to priority, and of the sad ending of the principals concerned. Some may be disposed to deny the term "great" to these men, nevertheless they were men of enterprise, courage and wide vision. We may be disposed to wonder and perhaps laugh at

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the vigour of their animosities, but those were the days when the thick stick was preferred as an argument to the kid glove. We do things differently now, but perhaps we are no better! At any rate, Mr. Flexner's "pioneers" did things the effects of which have lasted unto this day, and for that reason, if no other, they are entitled to a lasting niche in the Temple of Honour. "Doctors on Horseback" is a welcome addition to the shelf of books dealing with medical history.

American Medicine: Expert Testimony Out of Court. Published by the American Foundation, 565 Fifth Ave., New York, 1937: 2 vols., $3.50.

It is quite hopeless to attempt a short review of such a work as this. It is a report summarizing the results of an inquiry to medical men begun by the American Foundation some 18 months ago. The idea was to collect directly from medical men their views on the present system of medical care. Comments were to be as free as possible, and apparently they have not suffered from suppression. The result is an unusually full and representative expression of opinion. The first seven sections describe present trends in medical practice and education. The last four sections discuss various proposals for "distributing" medical care and lowering its cost, and for organizing medical care and public health services. The latter part therefore is more speculative than the first.

The book is a valuable contribution to this vital question of medical care, and is of equal interest to physician and layman, especially those in political quarters.

A Social Problem Group. Edited by C. P. Blacker, M.C., M.A., M.D., F.R.C.P. 228 pp., $4.50. McAinsh, Toronto, 1937.

Dr. Blacker presents in this book a series of articles by a number of authors who have attempted to make a study of various types of abnormal people with a view to determining the relationship between their abnormality and the type of social problem they present in different community settings. Such abnormal conditions as intellectual retardation and mental deficiency, epilepsy, alcoholism, delinquency, and neurasthenia are presented, with some statistical evidence to indicate the fact that the lowest 10 per cent of the social scale of most communities is largely composed of individuals with the above-mentioned mental abnormalities. The miscellaneous grouping of these various abnormal types into a social problem group may be justifiable from an economic standpoint. The main objective of this publication is evidently to emphasize the possible hereditary factors in these various abnormal mental types, but there is very little evidence in the material presented to suggest that there is such a definite hereditary basis. For those who may be interested in problems of social maladjustment and the eugenic approach to such problems this book will prove interesting.

Story of a Great Hospital: The Royal Infirmary of Edinburgh, 1729-1929. A. L. Turner, M.D., LL.D., Hon. F.R.C.P.(Edin.). 422 pp., illust., 10s. net. Oliver & Boyd, Edinburgh, 1937.

This book is more than the story of a great hospital; it is an account of the preservation and development throughout the ages of the "Hippocratic ideal". In the earlier pages we are led from Cos to Salerno, to Bologna, Padua, Montpellier, London, Leyden and Edinburgh. We learn much about the "Edinburgh tradition" and its effect on American medicine, on Philadelphia, New York and Montreal. We read about Hippocrates, Fallopius, Harvey, Linacre, Sylvius and Boerhaave, the Monros, Rutherford, Syme, Lister, Pitcairne, Morgan, Shippen, Rush and Bard and many others not less renowned. Speaking for Canada, instruction, coupled with the check of post-mortem study, has been the rule at McGill University since the inception of its medical faculty in 1823, for the four founders of its medical school, Holmes, Robertson, Stephenson and Caldwell, were Edinburgh men. By now the "Edinburgh tradition" is accepted universally, among the English-speaking medical world at least, as the ideal.

With the story of the Infirmary is bound up the story of the origin and development of the Edinburgh schools of medicine. Coincident with the paling of the star of Leyden brightened the star of Edinburgh, until Edinburgh became the Mecca of the medical student from Great Britain and most parts of the Empire. We are told, also, of the development of the voluntary hospital system, not only in Scotland but also in England. Naturally, the central theme is the origin and growth of the Royal Infirmary, and this is developed in detail and is well documented. All medical graduates of Edinburgh will delight in this book, and all those who are interested in an important epoch in the history of medicine should read it. The book is beautifully produced and is a bountiful ten shillings' worth.

Medical Records in the Hospital. M. T. MacEachern, M.D., C.M., D.Sc., F.A.C.P., F.A.C.H.A. 374 pp., illust., $3.50. Physicians' Record Co., Chicago, 1937.

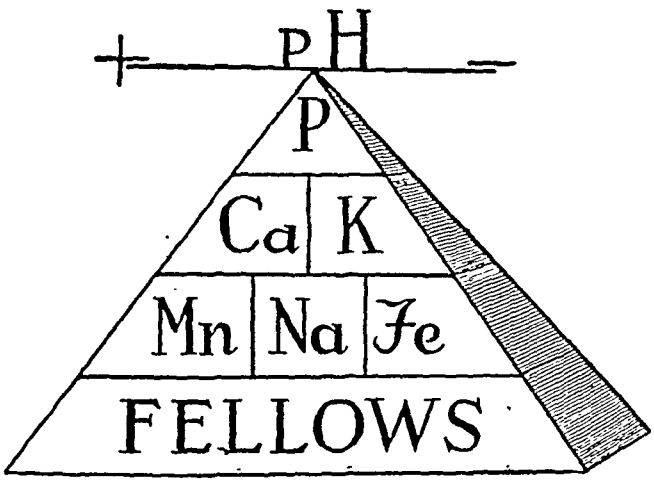
In the development of hospital efficiency and the advancement of our medical knowledge medical records have played a large part. During the past two decades a tremendous change has taken place in the extent and value and in the use and study of these records. It is fitting that Dr. Malcolm T. MacEachern should have written this work, as he, more than any other person, is responsible for the improvement of clinical records on this continent. In this volume, which is an amplification of the chapter on Records in his recently published "Hospital Organization and Management", Dr. MacEachern considers at some length the contents and form of the medical records in the various departments, the preservation of the records, their use, and the qualifications and training of the record librarian. He has an excellent chapter on clinical photography and a lengthy section on the hospital medical library, including a list of recommended texts and journals. There is an interesting section on footprints and handprints as a means of identification of the newborn by Dr. G. P. Pond, of Oak Park, Ill. This helpful volume should be in the medical library of every hospital and should be read by every staff member and intern.

A Textbook of Surgical Nursing. H. S. Brooks, Jr., M.D. 632 pp., illust., $4.00. McAinsh & Co., Toronto, 1937.

This is a very complete outline of the surgical conditions likely to be encountered by the nurse in hospital or private practice. The volume is well written and profusely illustrated. On the whole it would appear to be a work on surgery written for nurses rather than a treatise on surgical nursing, as the practical aspects of surgical nursing are not particularly featured. However, there is a good chapter on special procedures, such as catheterization, gastric lavage, etc., and a short chapter on medico-legal points of concern to nurses. The book may be recommended.

Greek Medicine. F. B. Lund, M.D., Boston. Clio Medica Series, No. 18. 161 pp., illust., $2.50. P. B. Hoeber, New York, 1936.

This small volume is one of the best of the "Clio Medica" series. Although early Greek Medicine has perhaps received less attention than one might wish the later period has been given adequate treatment. It would be hard to find a better estimate of Galen's influence of medical progress in so short a space.



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Phenomenon of Local Tissue Reactivity. G. Shwartzman, M.D. 461 pp., illust., $7.50. P. B. Hoeber, New York, 1937.

This is no book for the general practitioner. It is a valuable work for the bacteriologist and immunologist by one whose name is amongst the foremost of such investigators.

Practical Treatise on Diseases of the Skin. O. S. Ormsby, M.D. Fifth ed., 1334 pp., illust., $12.00. Lea & Febiger, Philadelphia, 1937.

One can only repeat the admiration expressed over previous editions of this work. Nothing of practical interest is omitted. The illustrations are fully up to the standard of excellence one expects from this publisher.

Chemistry of the Brain. I H. Page, A.B., M.D. 444 pp., $7.50. C. C. Thomas, Springfield and Baltimore, 1937.

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BOOKS RECEIVED

Laboratory Diagnosis of Syphilis. Harry Eagle, M.D. 440 pp., illust., $5.75. McAinsh, Toronto, 1937.

Mecanismo Probable de la Cancerizacion. A. Garibaldi, Professor de la Facultad de Ciencias Medicas. 2 vols. Published by Universidad Mayor de San Marcos, Lima, Peru, 1936.

The Culture of the Abdomen. F. A. Hornibrook. Eleventh ed., 92 pp., $1.75. Macmillan, Toronto, 1937.

Manual of Practical Tropical Sanitation. J. B. Kirk, M.B., Ch.B., M.R.C.P., D.P.H., D.T.M.&H., Director, Medical and Health Department, Mauritius. 300 pp., $2.25. Macmillan, Toronto, 1937.

Treatment of Some Chronic and "Incurable' Diseases. A. T. Todd, O.B.E., M.B., M.R.C.P. 203 pp., $3.00. Macmillan, Toronto, 1937.

Some Fundamental Aspects of the Cancer Problem. Edited by H. B. Ward. No. 4, Supplement to Science, vol. 85. 248 pp., illust., $2.50. Science Press, New York, 1937.

Medico-legal Aspects of the Ruxton Case. J. Glaister and J. C. Brash. 284 pp., illust., $6.25. Macmillan, Toronto, 1937.

Practical Neuroanatomy. J. H. Globus. 387 pp., illust., $6.00. University of Toronto Press, Toronto, 1937.

Tissue Reactions in Bone and Dentine. A. Wilton, Stockholm. 194 pp., illust., 15s. Henry Kimpton, London, 1937.

Physical Therapy in Arthritis. F. H. Krusen. 180 pp., illust., $2.25. P. B. Hoeber, New York, 1937.

Concepts and Problems of Psychotherapy. L. E. Hinsie. 199 pp., illust., $2.75. Columbia University Press, New York, 1937.

Perspectives in Biochemistry. Edited by J. Needham and D. E. Green. 361 pp., $4.50. Macmillan Co., Toronto, 1937.

Practical Guide to Massage. C. I. Carpenter. 127 pp., $1.50. Macmillan Co., Toronto, 1937.

Minor Maladies and Their Treatment. L. Williams, M.D. 7th ed., 439 pp., $3.00. Macmillan Co., Toronto, 1937.

Physical Signs in Clinical Surgery. H. Bailey, F.R.C.S. 6th ed., 284 pp., illust., $6.25. Macmillan Co., Toronto, 1937.

The Thinking Body. Mabel E. Todd, New York. 314 pp., $4.00. P. B. Hoeber, New York, 1937.

Behaviour Development in Infants. E. Dewey. 321 pp., $3.50. Columbia University Press, New York, 1935.

Short-wave Diathermy. T. de Cholnoky. 310 pp., illust., $4.00. Columbia University Press, New York, 1937.

Arteriovenous Aneurysm. E. Holman. 244 pp., illust., $5.00. Macmillan Co., New York, 1937.

Practical Methods in Biochemistry. F. C. Koch. 2nd ed., 302 pp., illust., $2.25. William Wood, Baltimore, 1937.

Principles and Practice of Rectal Surgery. W. B. Gabriel. 2nd ed., 363 pp., illust., 28s. net. H. K. Lewis, London, 1937.

General Hygiene and Preventive Medicine. J. Weinzirl. Edited by A. Weinzirl, Health Officer, Portland, Ore. 424 pp., $4.00. Lea & Febiger, Philadelphia, 1937.

Therapeutic Problem in Bowel Obstructions. O. H. Wangenstein. 360 pp., illust., $6.00. C. C. Thomas, Springfield, Ill., 1937.

Neurology. R. R. Grinker, M.D. 2nd ed., 999 pp., illust., $8.50. C. C. Thomas, Springfield, Ill., 1937.

The Postmortem Examination. S. Farber. 201 pp., $3.50. C. C. Thomas, Springfield, Ill., 1937.

Pseudocyesis. G. D. Bivin, Ph.D. and M. P. Klinger, M.A. 265 pp., $4.00. Principia Press, Bloomington, Ill., 1937.

Functional Activities of the Pancreas and Liver. C. W. McClure. 318 pp. Medical Authors' Publishing Co., New York, 1937.

Biological Standardization. J. H. Burn. 288 pp., illust., $6.50. McAinsh, Toronto, 1937.

Prognosis in Schizophrenia and the Factors Influencing the Course of the Disease. G. Langfeldt. 228 pp., $3.75. McAinsh, Toronto, 1937.

Practical Physiological Chemistry. P. B. Hawk and O. Bergeim. 11th ed., 968 pp., illust., $8.00. P. Blakiston's Son & Co., Philadelphia, 1937.

The Little Things in Life. B. Sure, Ph.D. 340 pp., $2.75. Ryerson Press, Toronto, 1937.

The Business Side of Medical Practice. T. Wiprud, Exec. Secretary, Medical Society of Milwaukee County. 177 pp., illust., $3.00. McAinsh, Toronto, 1937.

Proceedings of the Second National Conference on College Hygiene, Washington, D.C., December 28-31, 1936. 112 pp. Published by National Tuberculosis Association, New York, 1937.

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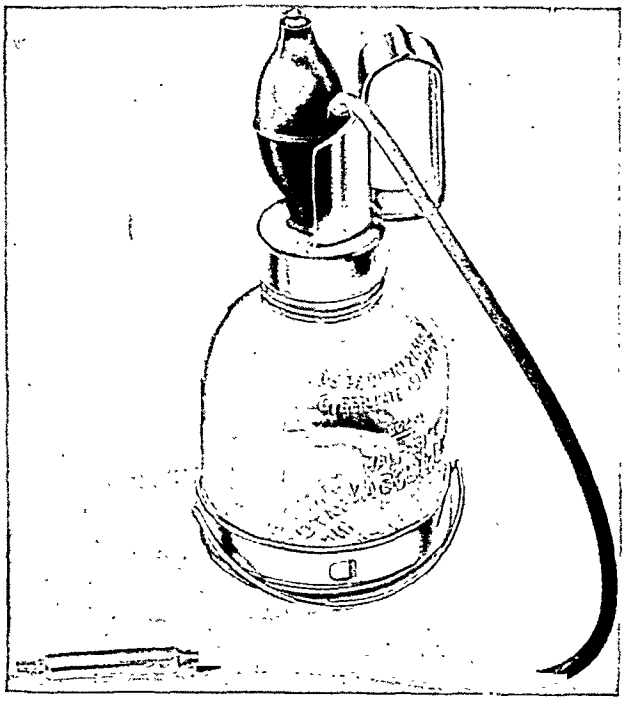
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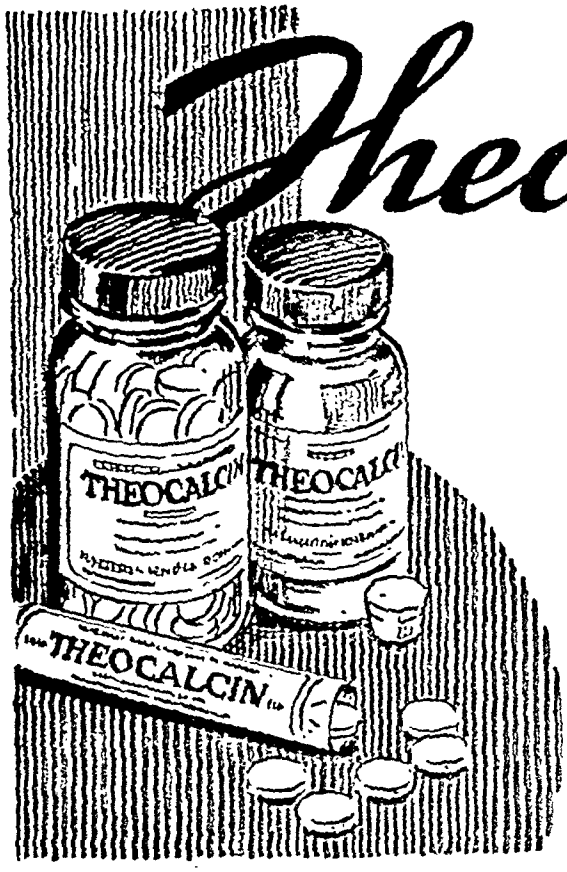
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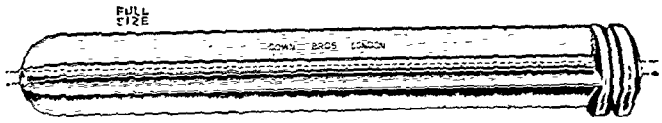
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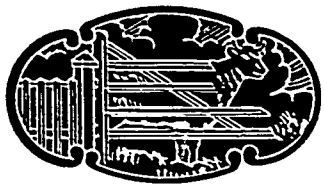
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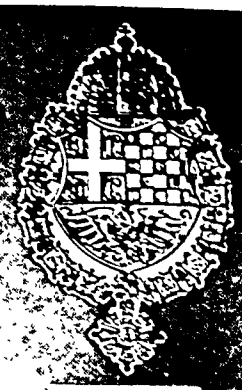
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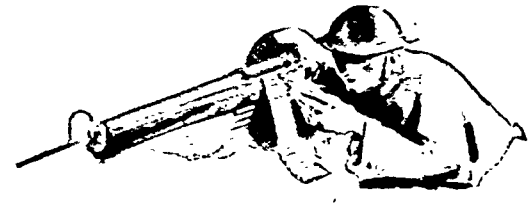
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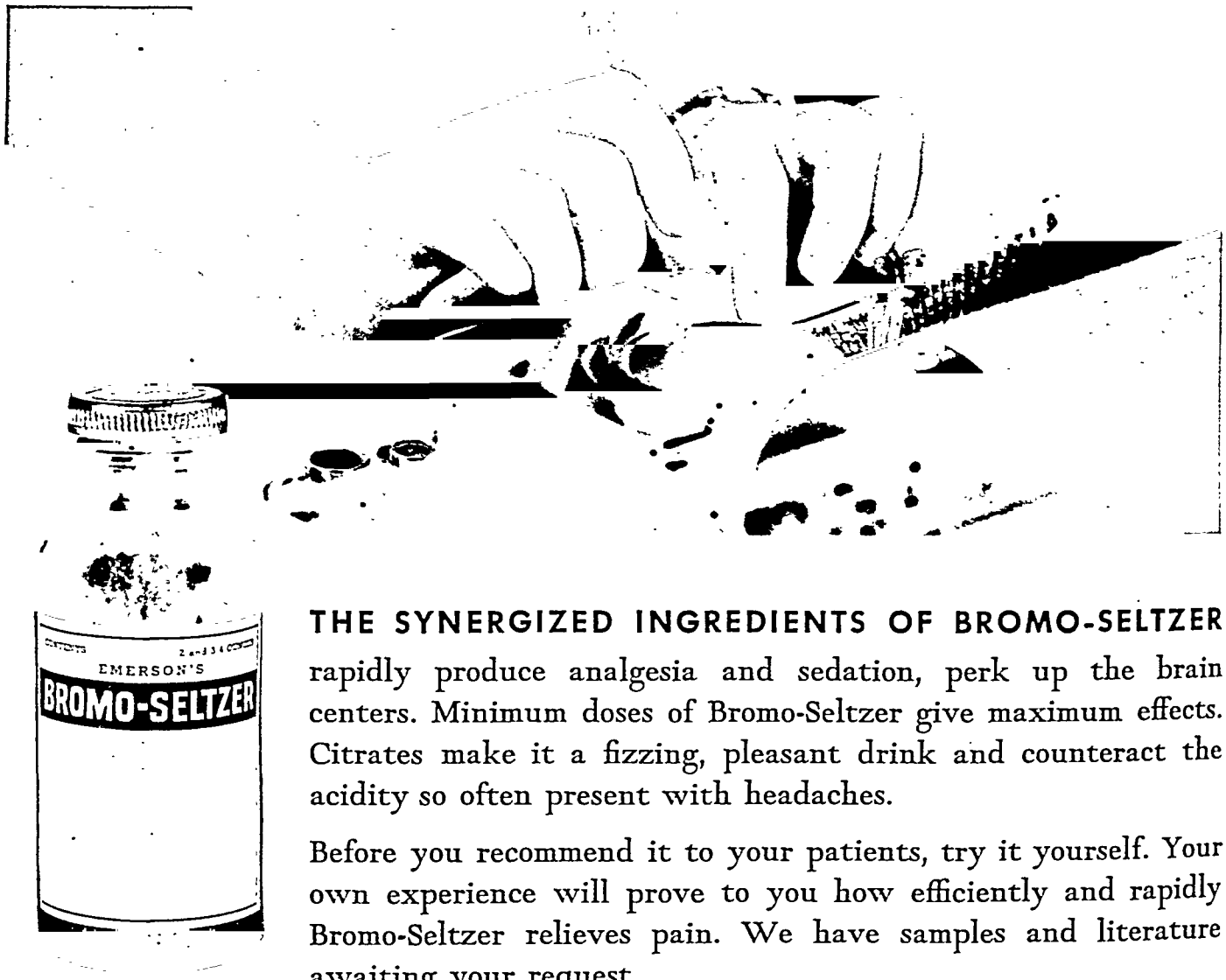
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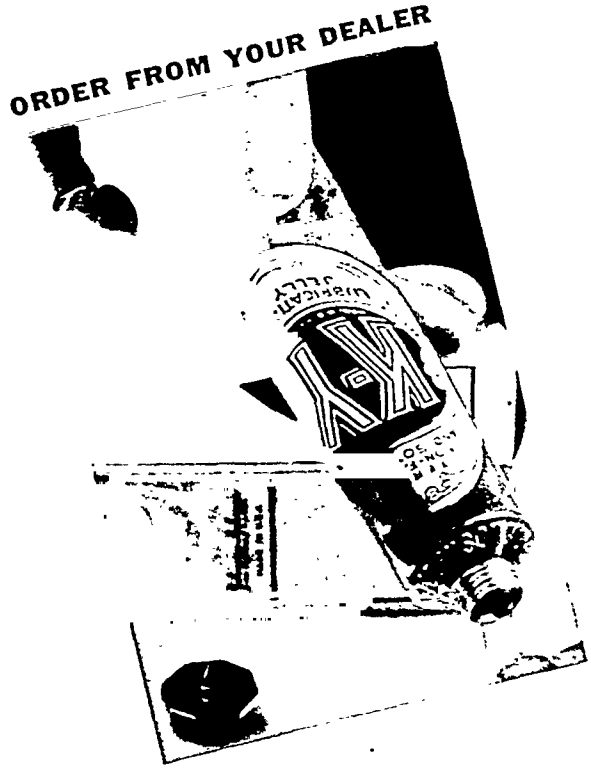
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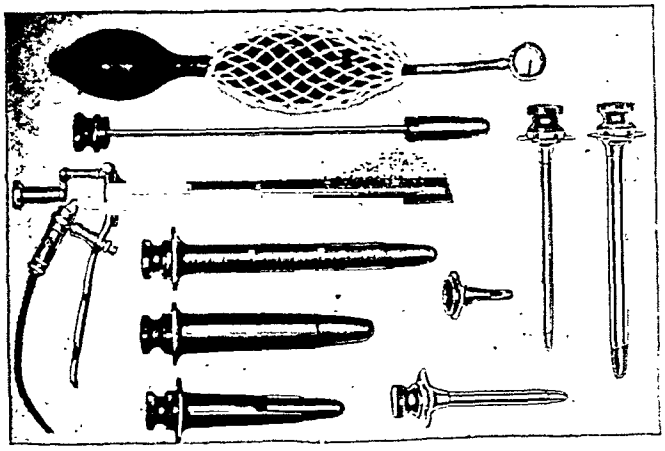


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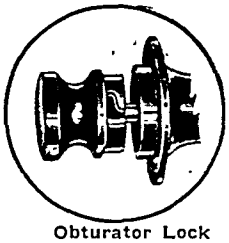
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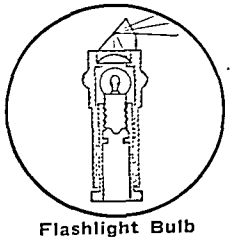


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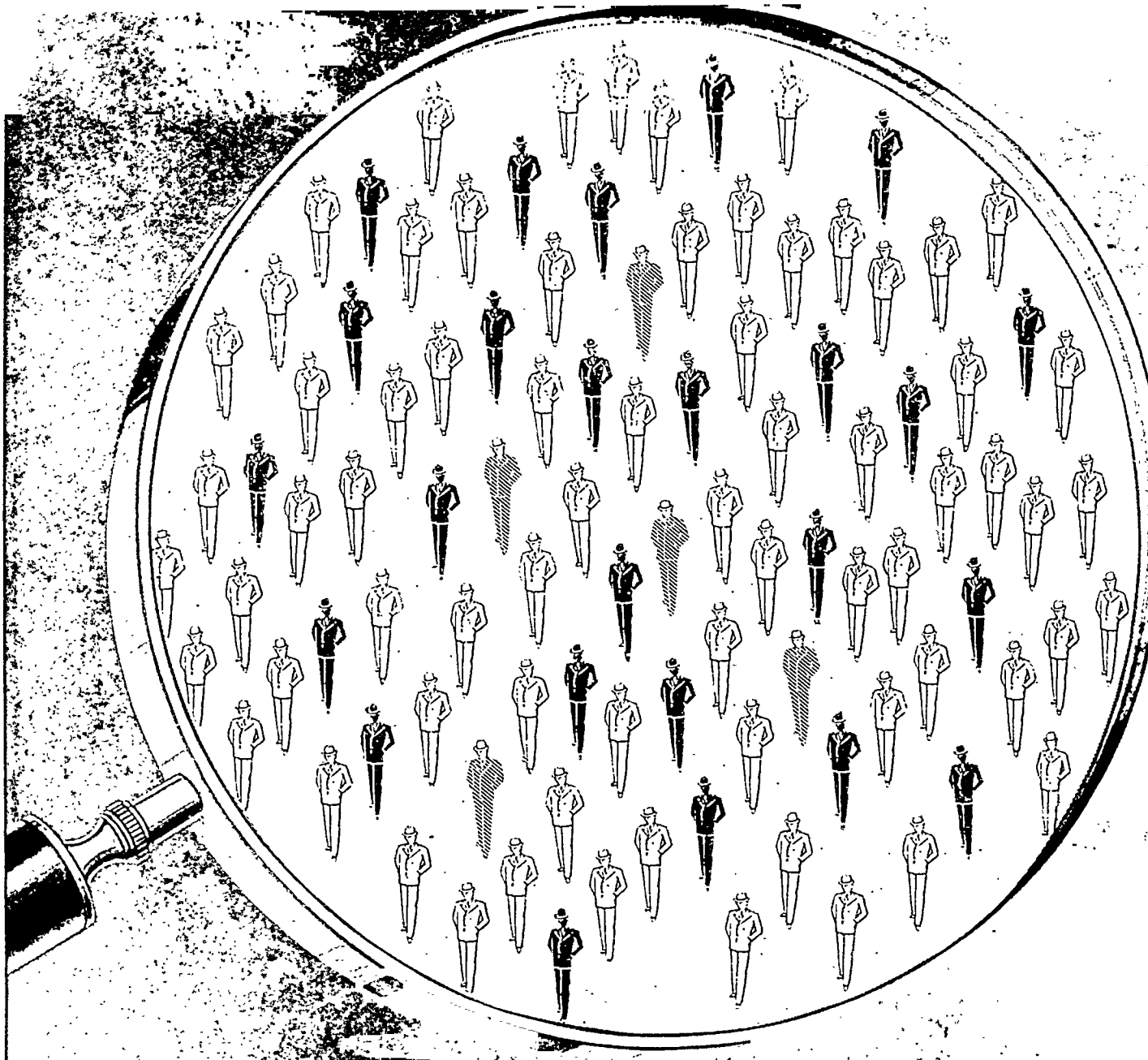
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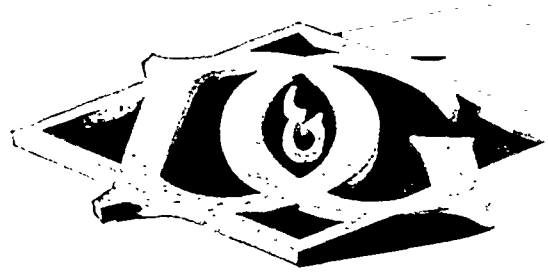


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*BECK, page 98, "Obstetrical Practice," published by the Williams and Wilkins Co., 1935.

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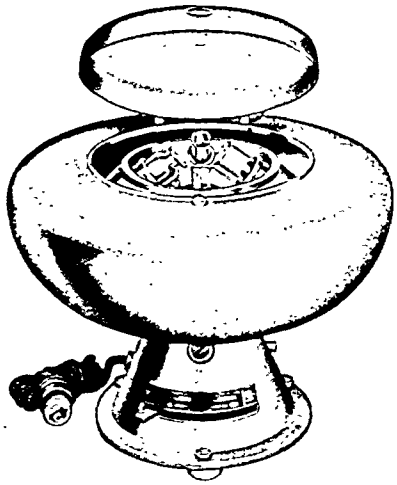
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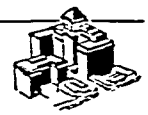
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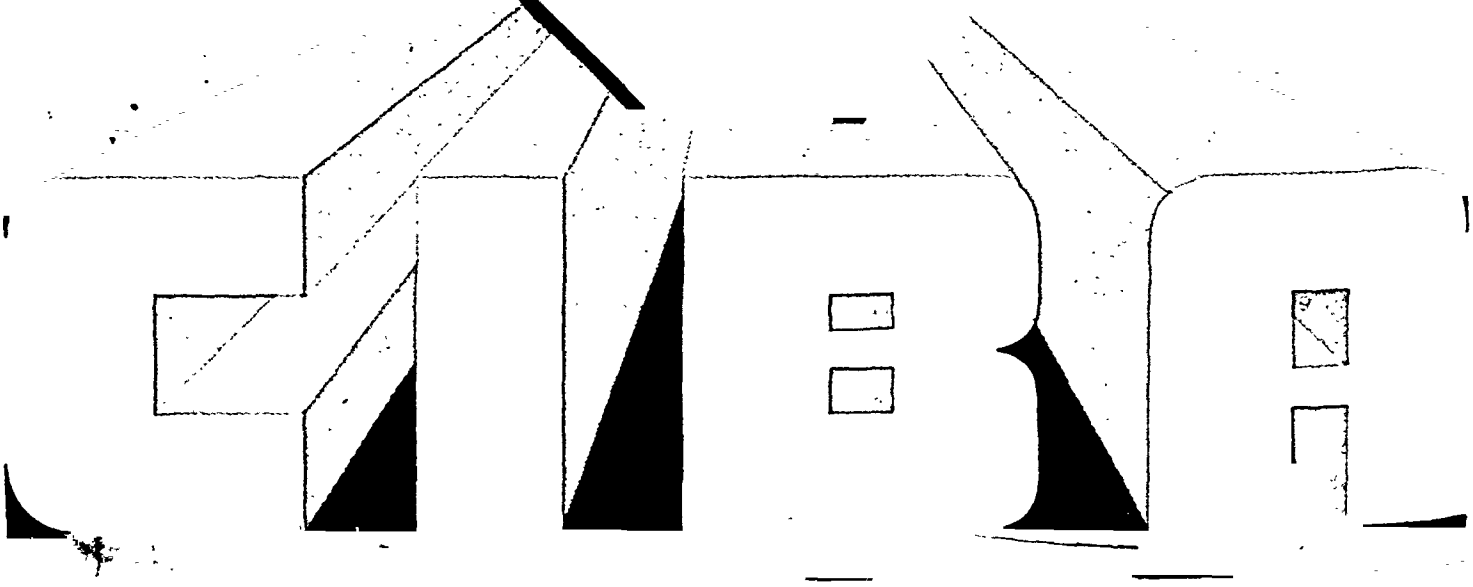
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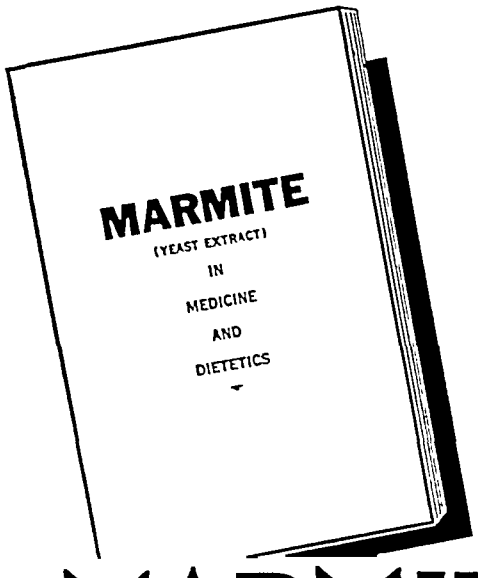
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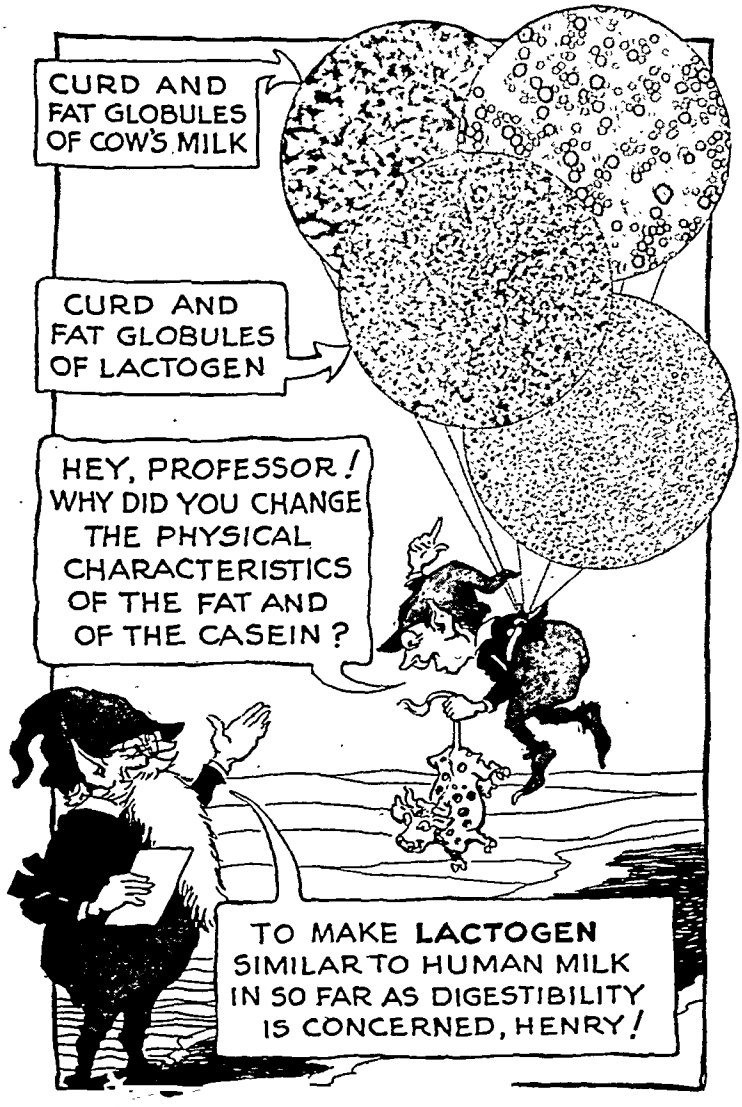
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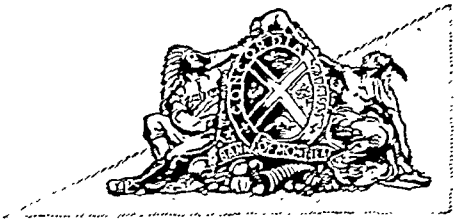
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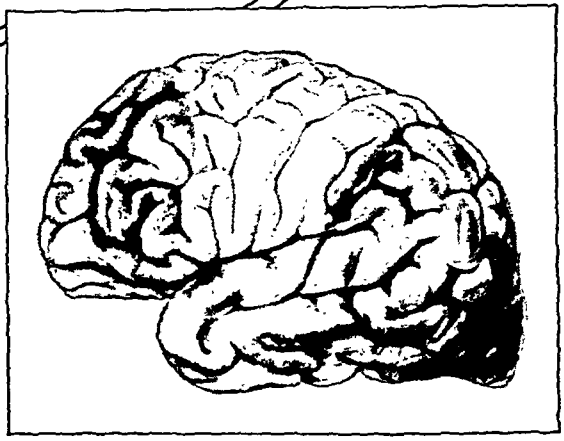
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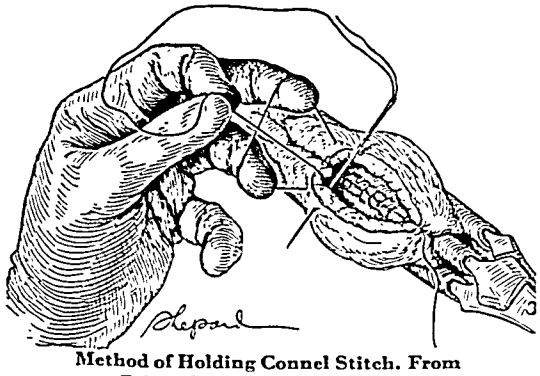
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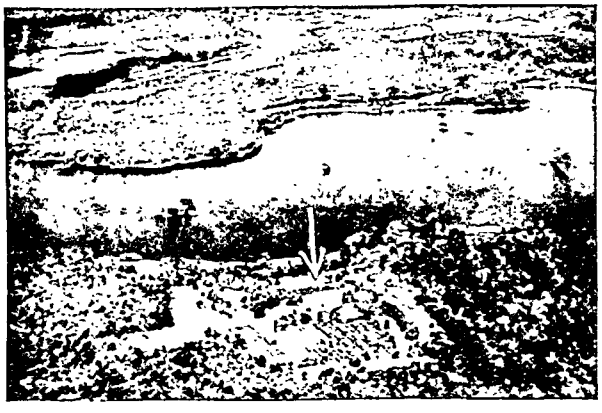
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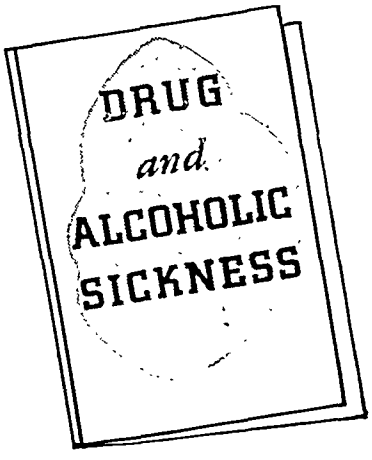
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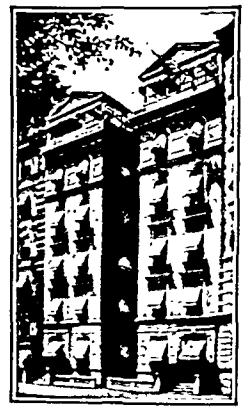
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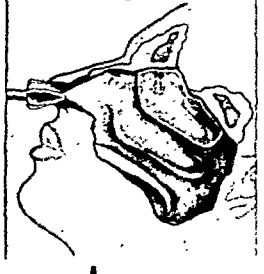
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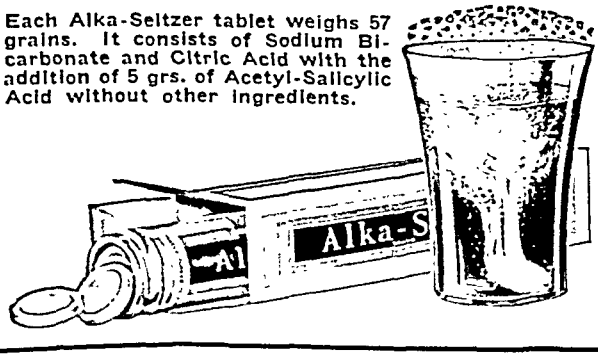
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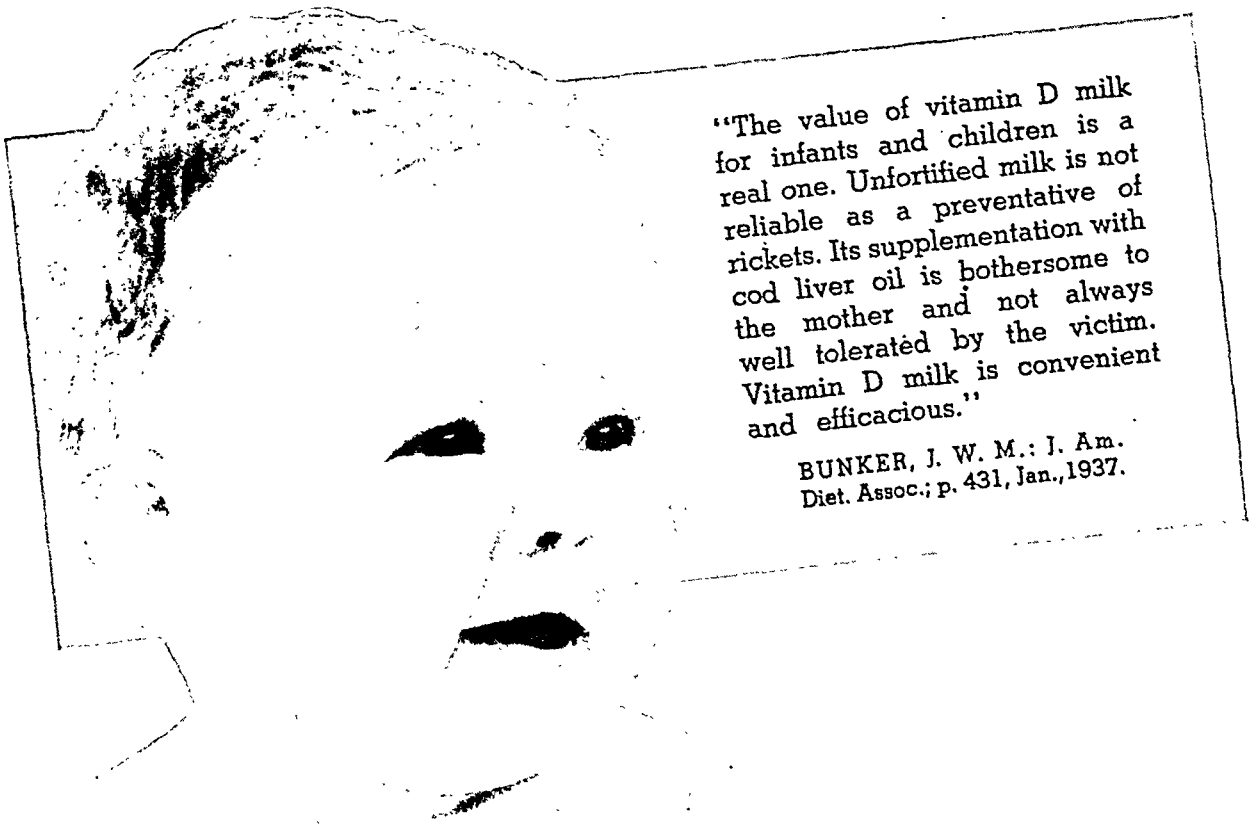
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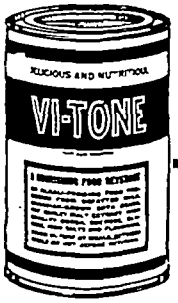
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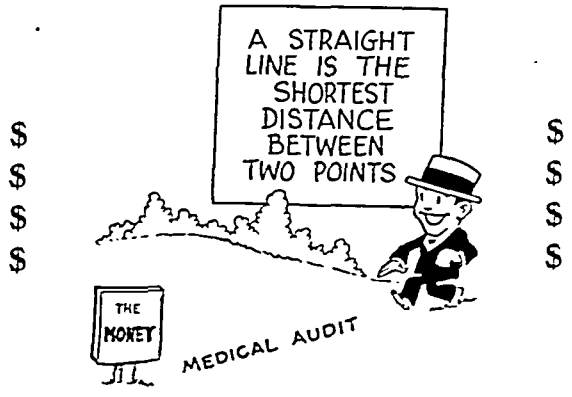


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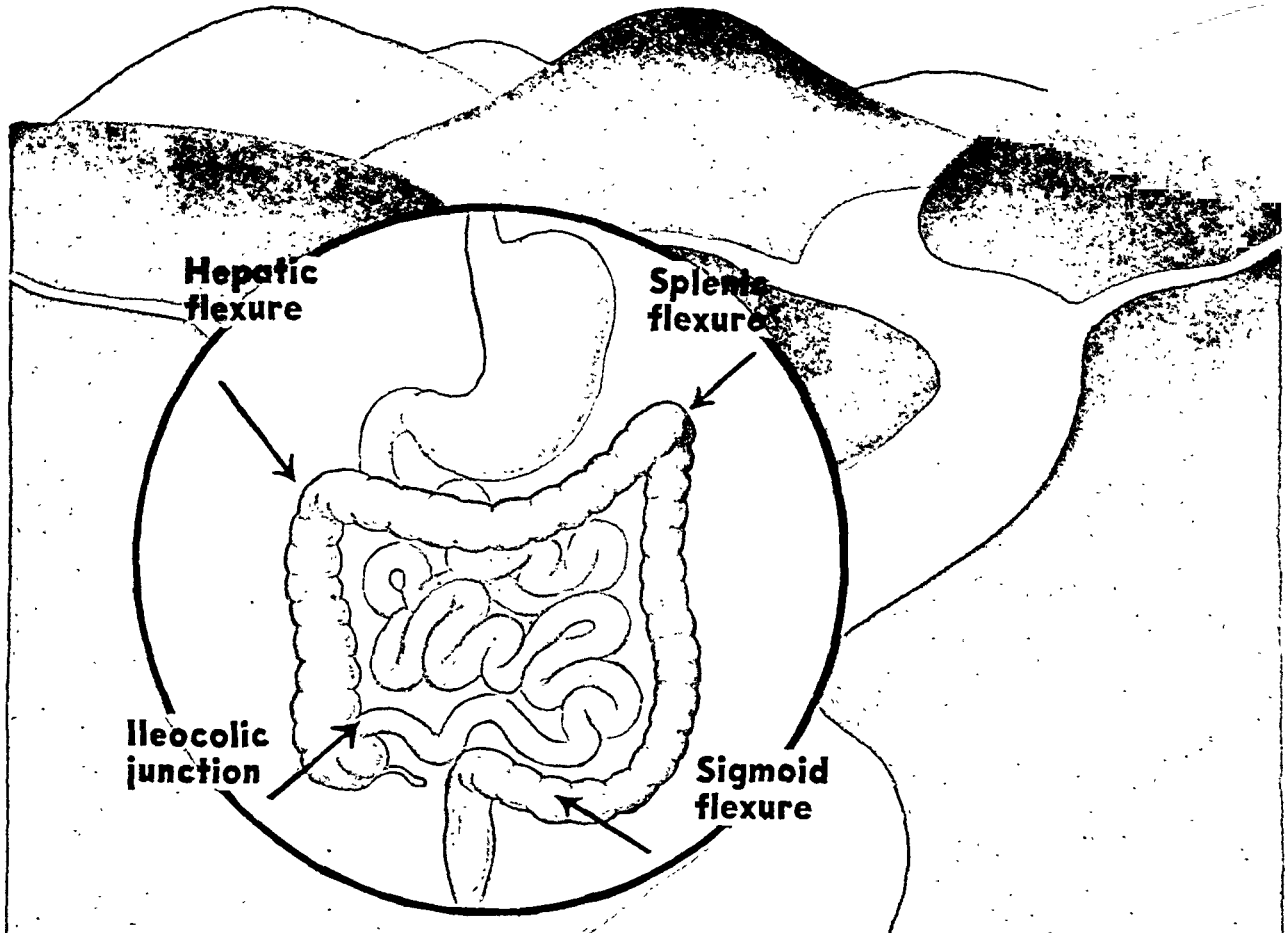
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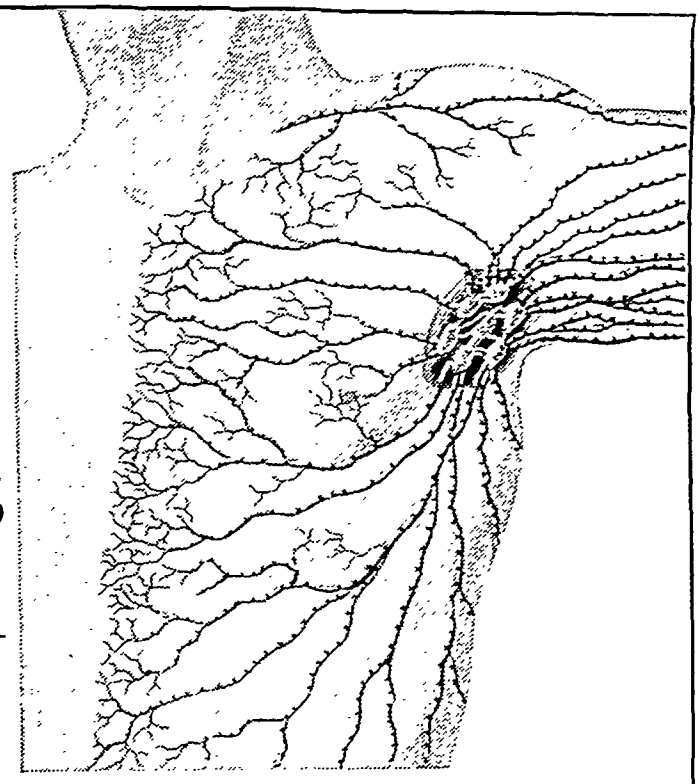
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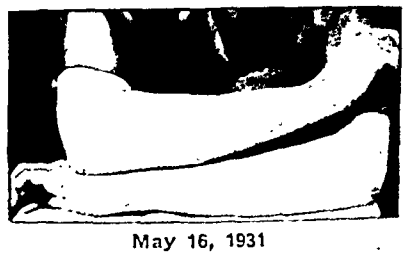
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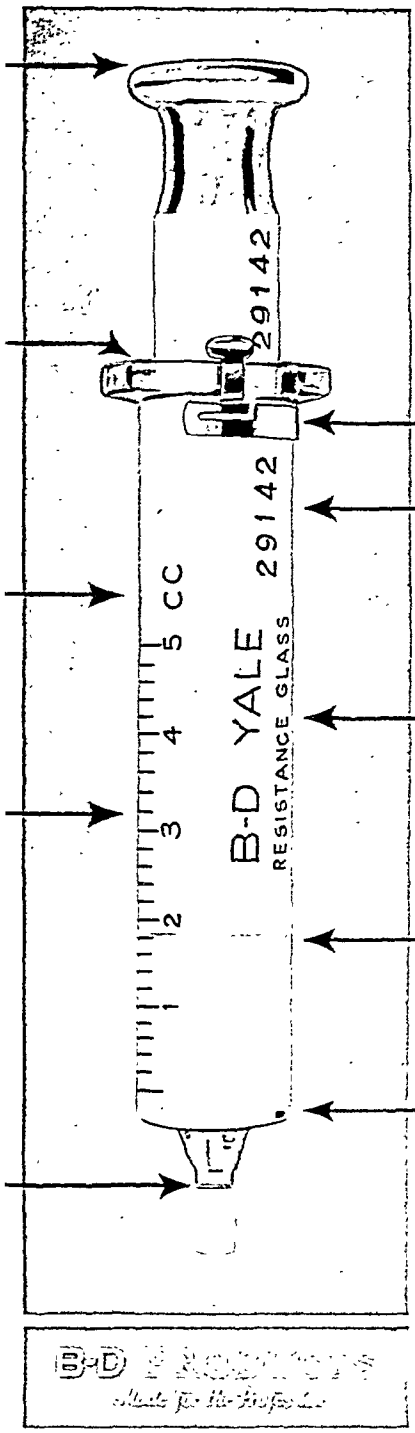
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Vol N. 38 N. 3



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Editor, A. G. NICHOLLS, M.A., M.D., D.Sc., F.R.S.C., F.R.C.P.(C.)
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Vol. 38 MARCH, 1938

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OBJECTS: To assist in the defence of its members in cases of alleged malpractice, and to encourage honourable practice in the daily work of the medical profession. The annual fee is five dollars per calendar year, half-rates after July first.

Subject to our by-laws, assistance is given by the payment of the taxable costs of actions together with reasonable counsel and witness fees in cases undertaken by our Association, as well as damages if awarded. All members in good standing of the Canadian and various Provincial Medical Associations may be enrolled upon signing the application form and paying the annual fee. All other regularly qualified practitioners must have their application countersigned by two members of our Association. Blank application forms and other literature upon request.

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CANNED FOODS AND THE PUBLIC HEALTH

I. Food in the Open Can

● One question commonly asked concerning canned foods is whether or not the contents of the can should be removed to another container immediately after opening. This question has its origin in the belief that if food is allowed to remain in the can after opening, it will absorb an injurious substance from the can and thus become hazardous to the health of the consumer.

For this belief there is not the slightest foundation of fact. Its origin probably lies in the old "ptomaine" concept of food poisoning. Why it should persist in the light of present day knowledge is a mystery. The belief that food must be emptied immediately from the can has been as thoroughly discredited as the "ptomaine" theory of food poisoning (1).

Food poisoning is usually caused by the ingestion of food containing certain bacteria or their metabolic products. It is, in most instances, the direct result of improper preparation, handling, or storage of food (2) (3).

All canned foods are subjected to thorough heat treatment which destroys not only pathogenic bacteria and their products, but also the most resistant organisms which may cause spoilage. Consequently, the freshly opened can is the cleanest container in the average kitchen.

There is, therefore, no reason from the standpoint of food poisoning why the food must be removed immediately after the can is opened. In addition, food will spoil no faster or no slower in the open can than in any other open container. The same precautions should be used in its preservation as are used for any other cooked food.

With certain foods, it is desirable from the standpoint of quality to remove the food from the can. Such foods, usually those of an acid nature, may act slowly on the can after air is admitted and small amounts of tin and iron may be absorbed. The traces of these metals have been shown to be entirely innocuous (3), but iron in particular may impart a slight taste to the food.

Modern science has dispelled the old belief that, from the standpoint of health, food must be removed immediately from the can. The cooperation of the medical profession in dispelling this old and unfair prejudice against their products is earnestly solicited by the members of the Canadian canning industry.

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(3) Food-Borne Infections and Intoxications, F. W. Tanner, Twin City Printing Co., Champaign, Illinois

CANNED FOODS AND THE PUBLIC HEALTH

II. The "Ptomaines"

● Many requests received for information on canned foods have inquired as to some of the public health aspects of this class of foods. We appreciate the frank interest of our readers in this subject about which so much misinformation exists. We are glad, therefore, to devote this discussion, as well as subsequent ones, to the most popular of the lay misconceptions concerning the wholesomeness of commercially canned foods.

Some laymen hold the belief that canned foods, in some mysterious manner, develop "deadly ptomaines" within the can and hence the consumer of such foods stands in danger of "ptomaine poisoning." In the light of modern knowledge, this belief is ludicrous; it probably had its origin in the old "ptomaine theory" of food poisoning, now so thoroughly discredited by modern medical authorities (1).

Between the years 1870 and 1880, a large number of substances were obtained from protein material which had undergone bacterial putrefaction. These substances were aptly called "ptomaines", from the Greek "ptoma" or "dead body". Toxicologists of the day ascribed marked toxic properties to the new found ptomaines, chiefly by injection studies rather than by feeding tests.

The science of bacteriology was then in its infancy—the true causes of food infection or intoxications were not known. Consequently, the discovery of the ptomaines, with their alleged toxic properties, permitted the convenient diagnosis of "ptomaine poisoning" for all illnesses following the ingestion of foods. Today, we know that such illnesses usually result from the ingestion of food which had been infected by certain bacterial groups, and not from protein degeneration products such as ptomaines (2, 3)..

One authority has stated that "ptomaine poisoning is a good term to forget" (4).

To this we might add that it would also be well to discard the old, unfounded belief that foods in the tin can develop substances hazardous to health.

Canned foods are merely selected foods which, after proper preparation, are sealed in hermetic tin containers and given a heat process calculated to destroy pathogenic and spoilage organisms which might be present on the raw foodstuff. The hermetic seal prevents future infection of the food by such organisms and insures its preservation and wholesomeness.

Such are the simple facts. The cooperation of the medical profession is earnestly solicited in combating the ludicrous, yet widespread, lay prejudice against commercially canned foods.

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(1) Journal American Medical Association, 90, 459 and 1573 (1928).

(2) Food-Borne Infections and Intoxications, F. W. Tanner, Twin City Pub. Co., Champaign, Ill., 1933.

(3) Food Poisoning and Food-Borne Infections, E. O. Jordan, University of Chicago Press, 2nd Ed., 1930.

(4) Preventive Medicine and Hygiene, M. J. Rosenau, Appleton-Century, New York, 5th Ed. 1927, p. 668



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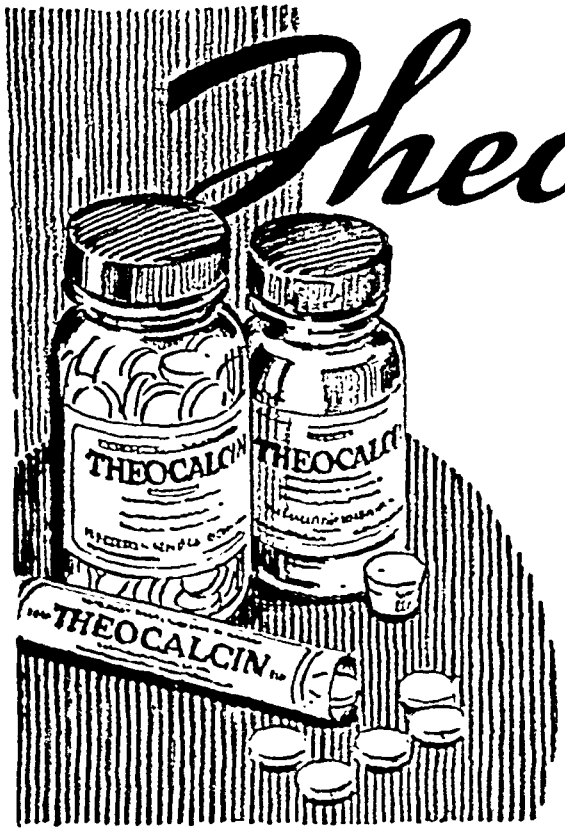
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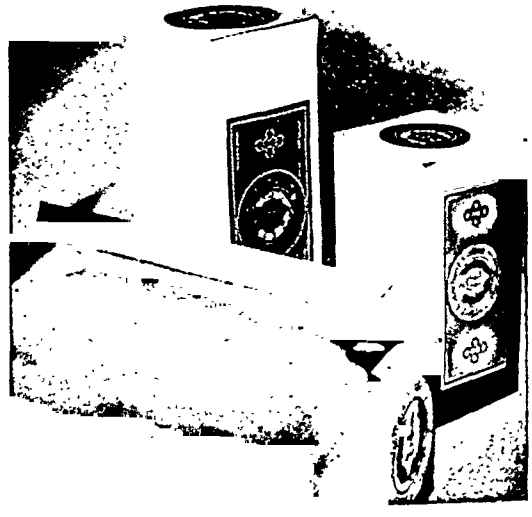
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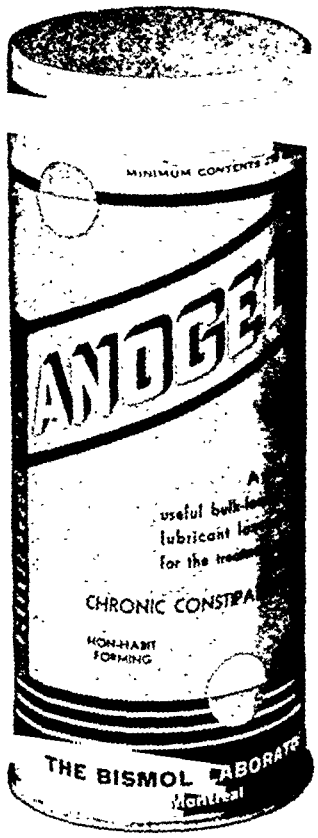
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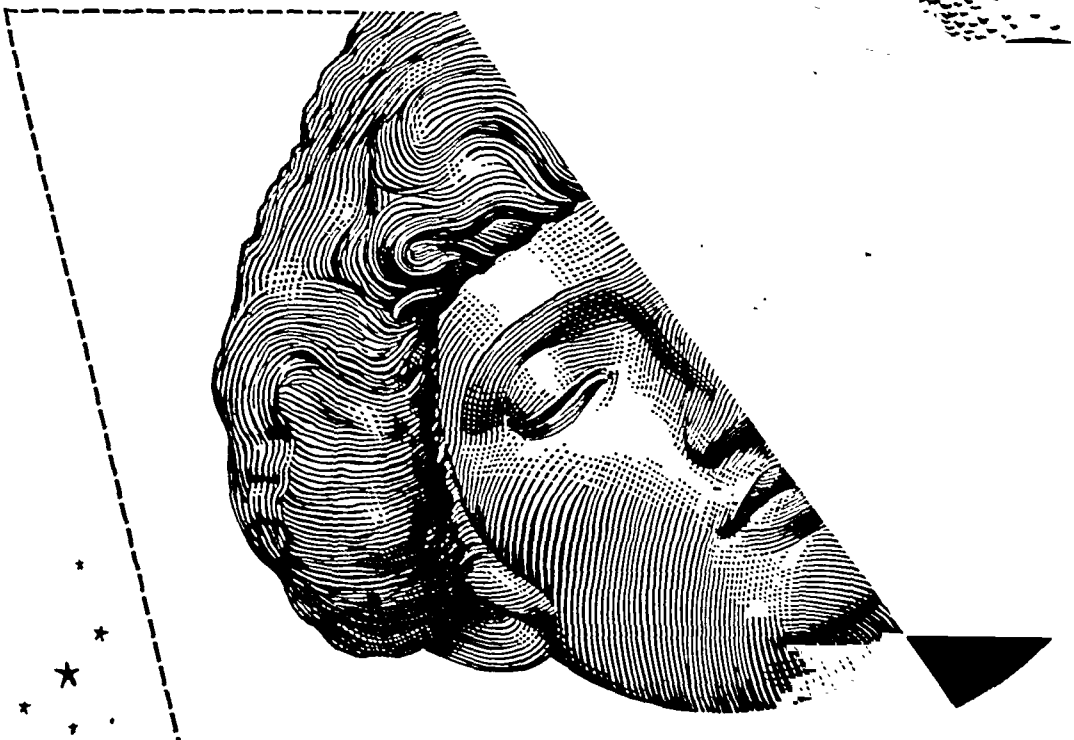


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A STUDY OF THE CRYSTALLINE SILICEOUS MINERALS PRESENT IN SILICOTIC LUNGS BY THE X-RAY DIFFRACTION METHOD

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THIS paper reports the results of an x-ray diffraction pattern study of the crystalline siliceous material present in the lungs of 35 men exposed to dusts containing free and/or combined silica. This series was selected to include as many different mining and industrial exposures as possible, and the 35 cases examined were divided arbitrarily into five groups. Only 20 cases have been reported, and the individual cases in each group were chosen for the purpose of showing the maximum variations which occur in the x-ray diffraction patterns of the siliceous portion of the lung ashes of workmen having similar types of mining or industrial exposures. The number presented in each group in no way indicates the incidence of silicosis in any particular mining area or industrial occupation. At the beginning of the experiment it was anticipated that the films obtained would be characteristic for each type of exposure. The data presented in this paper tend to show that in most of the 35 cases very little information concerning the dust exposure can be gained from the appearance of the x-ray diffraction pattern.

The x-ray diffraction method is limited to the estimation of the relative proportions of the different siliceous minerals present and gives no indication of the total amount of siliceous material which may be present in a lung. On the other hand, in dealing with atmospheric dusts information concerning the percentage composition of the siliceous material is a great aid in evaluating the severity of the exposure.

Some of the lungs exhibited marked silicosis, while others presented moderate or early types of this disease. In many cases the primary cause of death was not attributable to the dust exposure, and this probably accounts for the high proportion of cases which showed no evidence of active tuberculous infection.

EXPERIMENTAL DETAILS

(*a*) *Production of the x-ray diffraction patterns.*—If a beam of x-rays of a single wave length is photographed only a spot will be recorded on a film. However, if finely divided or minute crystals of a mineral are placed in the path of the beam most of the rays will pass through without deviation, but some of the rays will be diffracted and, when photographed, these diffracted rays will produce on a film a pattern consisting of a series of concentric rings which depend upon the arrangement of the molecules within a crystal. Each mineral gives a relatively simple but characteristic pattern consisting of rings of unequal intensities. These rings are shown diagrammatically in Fig. 1. With

mixtures more complex patterns are produced, depending upon the number of different minerals present, and the relative intensities of the individual patterns are proportional to the quantities of the substances present in a mixture. In

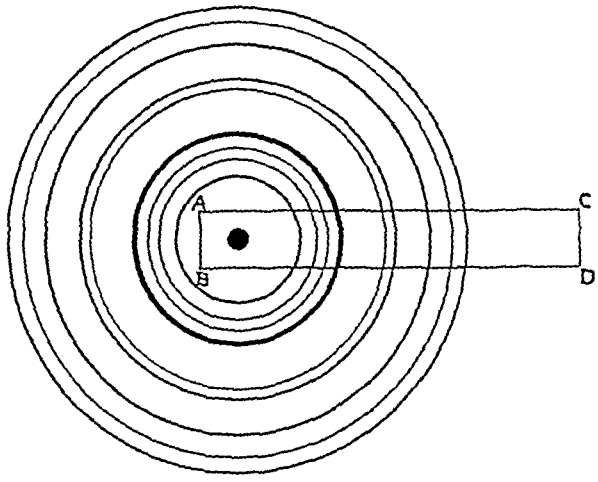


Fig. 1.—Diagrammatic representation of a cross section of the concentric rings produced by the passage of a beam of monochromatic x-rays through finely divided crystalline material.

practice all of the diffracted rays are not photographed in their entirety but one small area is reproduced as shown in rectangle a, b, c, d. Thus just a small section of each ring appears on a film. In this paper the prints of the films have been trimmed to a size suitable for reproduction.

The x-ray diffraction patterns were obtained by the method described by Walker, Clark and Reynolds.[1, 2] The x-rays were produced by a Muller Line-Focus Metalix tube with a copper anode to which was applied an unrectified electromotive force of 40 K.V. peak. The current through the tube was 20 milliamperes. The beam of x-rays was made approximately homogeneous (1.54 A U) by a filter of nickel foil 0.01 mm. thick. Its intensity was such that the diffraction patterns of the dusts could be photographically recorded in two hours. Two diffraction cameras of the Debye-Scherrer type were used. Each was 6.5 cm. in radius and the x-ray beam was defined by two pin holes, 0.75 mm. in diameter, 7 cm. apart. The dust sample was pressed into a small block and supported at the centre of the camera in such a position that the x-ray beam fell on one face at an angle of 18 degrees, at which setting the main bands of the minerals present were sharply defined. The top of the beam just grazed the upper edge of this face.

The sample was made to oscillate with uniform velocity at a frequency of about twenty-five oscillations per minute, through 2½ degrees to each side of the 18 degree position in order that the irregularities in the diffraction pattern caused by larger fragments in the sample might be smoothed out. The cameras were made light-tight so that it was not necessary to cover the inner surface of the photographic film with opaque paper. This eliminated irregularities due to the non-uniform absorption of the x-rays by the paper and reduced the necessary exposure time by one-third. Dupont x-ray film was used and was developed in a dilute glycin developer which was found to give satisfactory contrast and detail in the films.

(*b*) *Standard minerals.*—A survey of the occupations of the persons who were studied suggested that one or more of the following eleven minerals would possibly be present in the lungs in detectable amounts, namely, muscovite, kaolin, quartz, microline, orthoclase, albite, oligoclase, talc, tourmaline, chlorite and tremolite. Samples of the above minerals were obtained in as pure form as possible through the kindness of the Department of Mineralogy, University of Toronto, and the Ontario and Dominion Departments of Mining. These minerals were ground in petroleum ether in a small ball mill constructed of case hardened tool steel. The ground samples of the materials used for the diffraction patterns were powders having a particle size of less than 5 microns.

(*c*) *Mine dusts and tamping powders.*—A number of samples of underground aerial dusts were procured from the following Ontario mining areas: Kirkland Lake, Porcupine and Sudbury. The material was obtained by means of a household vacuum cleaner fitted with a fine exhaust bag, and, to obtain sufficient quantities, from 2 to 6 weeks were necessary for the collection of each sample. Similar x-ray diffraction patterns were obtained from each of the samples procured from the same district, and for this reason only three prints were reproduced for publication—one from each of the three areas mentioned above. Tamping powders used in these mining areas were included in this study, as it was thought that their mineral constituents might be present in some of the lung ashes under investigation.

(*d*) *Preparation of the lung ashes.*—The dry weight was obtained by heating a representative portion of the lung to constant weight in an oven at 110° C. Most of the ashes were prepared in the following manner. The lung was well washed with water to remove as much of the formalin as possible and then transferred to one or more two-litre beakers, depending on the amount of tissue used. Concentrated nitric acid was added to the depth of about half an inch. The initial action was very vigorous. Additional quantities of concentrated nitric acid were added at intervals as needed and the lung allowed to slime at room temperature for about two weeks. When the sliming was complete the acid solution was diluted with an equal volume of distilled water and filtered through Whatman No. 54 filter papers. The residue was washed with distilled water until free of acid.

The residue was removed from the filter paper, transferred to platinum dishes, and evaporated to dryness. Then the platinum dishes and contents were gently heated to remove the organic material. The final incineration was done in a muffle furnace at dull red heat. This crude acid-insoluble fraction was transferred to a centrifuge tube and treated with 50 per cent nitric acid. The tube and contents were placed

in a beaker of hot water for ten or fifteen minutes and stirred frequently. After cooling the mixture was centrifuged and the supernatant liquid was decanted off and added to the original filtrate. The process was repeated several times with 50 per cent hydrochloric acid and finally with distilled water. The residue, consisting mainly of silica and silicates, was washed into a platinum dish, evaporated to dryness, cooled and weighed.

Three of the lungs, namely 1335, 1384 and 1552, were not digested in nitric acid but were incinerated directly. The ash was treated as above with 50 per cent nitric acid, and then with 50 per cent hydrochloric acid in order to remove the soluble fraction. The total silica content of the acid-insoluble part of each lung ash was determined by fusing the ash with sodium carbonate, dehydrating the silica with hydrochloric acid and volatilizing with hydrofluoric acid. It was found that satisfactory x-ray diffraction patterns could be obtained without grinding the lung ashes in a ball mill, as they already existed in a finely divided state.

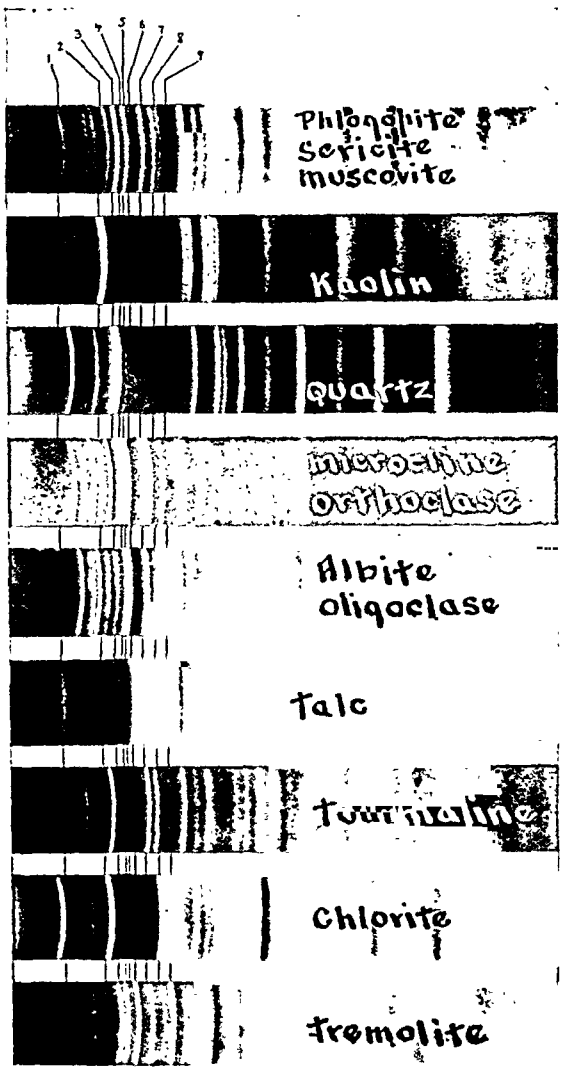


Fig. 2.—X-ray diffraction patterns of pure minerals commonly present in industrial and mine aerial dust.

FINDINGS

(*a*) *Standards.*—The x-ray diffraction patterns of the minerals chosen as standards are shown in Fig. 2. As the patterns given by the mica group of minerals which were investigated (phlogopite, sericite, and muscovite) were essentially the same, only one print from this group is presented. For the same reason, only one picture each is given for the potash feldspars (microcline and orthoclase) and for the soda feldspars (albite and oligoclase). Inspection of Fig. 2 shows that the pattern for each mineral is composed of a series of bands of varying intensities. The strong or primary bands occur at different distances from the centre of the pattern, and are usually those chosen for the identification of the individual minerals. In the series of standards which were used these primary bands show no interference with each other except in the case of quartz and the mica group. In this case it is necessary to use a weaker or secondary band for the identification of the mica group. These secondary bands are easily seen

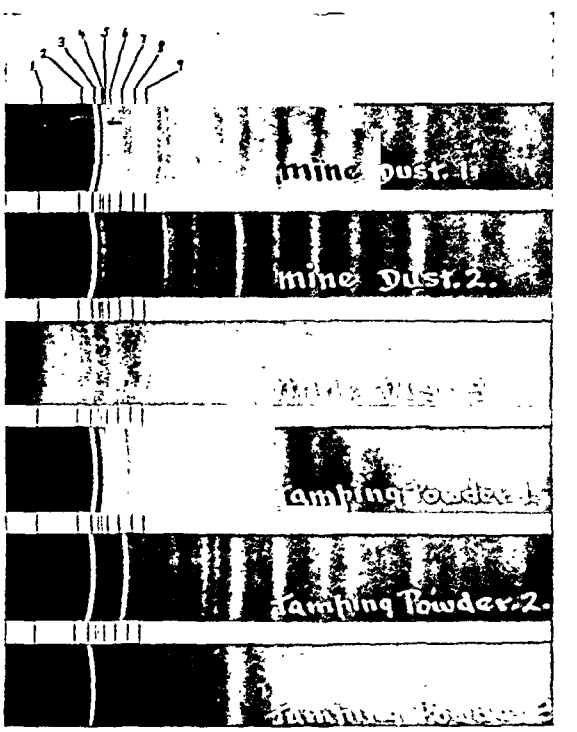


Fig. 3.—X-ray diffraction patterns of aerial mine dusts and tamping powders.

Fig. 4

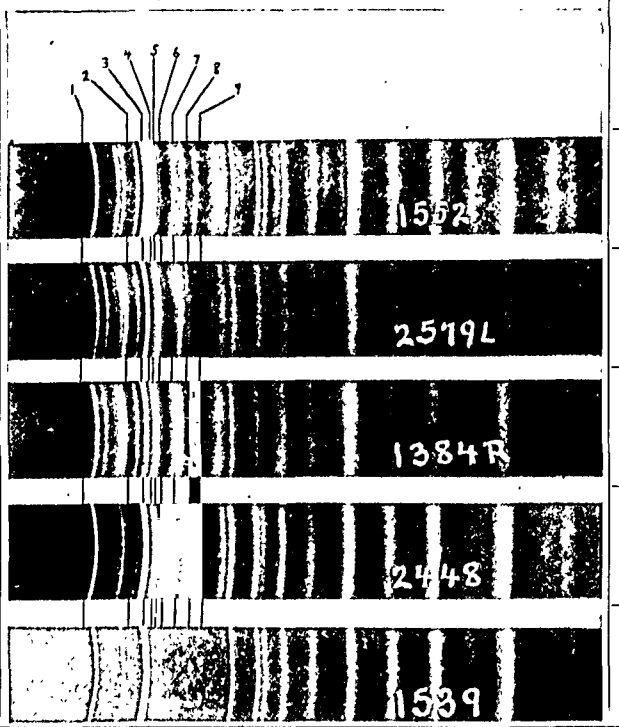
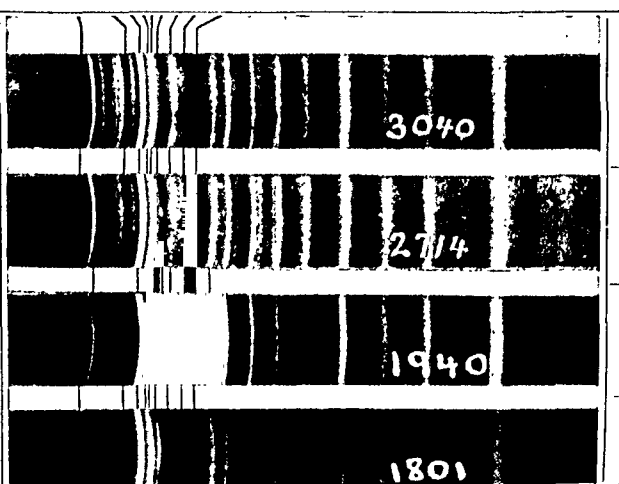
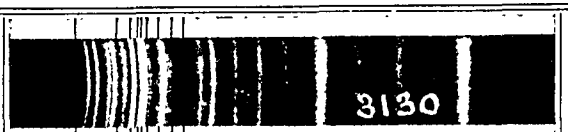
Age at death	INDUSTRIAL EXPOSURE	*Interval in months between last exposure and death*	*Post-mortem lung findings*	*X-ray diffraction patterns of acid-insoluble fraction of lung ashes*	*Mg. total SiO_2 per 100 g. lung dry weight*	*Minerals present*
55	17 years brick-maker, England 14 years flint clay feldspar	1	Silicosis No tuberculosis		2110	Quartz+++ Potash feldspar++
60	4 years granite cutting, Scotland 6 years granite cutting, England 20 years granite cutting, Ontario	60	Silicosis Tuberculosis		5380	Soda feldspar+++ Quartz++ Potash feldspar trace
55	10 years granite cutting, Scotland 20 years granite cutting, Ontario	19	Silicosis Tuberculosis		7890	Potash feldspar+++ Quartz++
45	12 years enameller quartz and feldspar	23	Silicosis Tuberculosis		4670	Quartz++++ Potash feldspar trace
42	6 years sand blaster	8	Silicosis No tuberculosis		1310	Quartz+++++

Fig. 5

	PORCUPINE EXPOSURE					
41	14 years	39	Early silicosis No tuberculosis		1000	Quartz++ Soda feldspar++ Mica+
53	13 years	1	Silicosis Tuberculosis		1100	Quartz++ Soda feldspar++ Potash feldspar trace Mica+ Talc trace
39	10 years	81	Silicosis Tuberculosis		940	Quartz+++ Mica++ Potash feldspar trace
55	6 years (in mill)	1	No silicosis No tuberculosis		90	Quartz++ Potash feldspar trace Soda feldspar trace Mica++ Talc trace

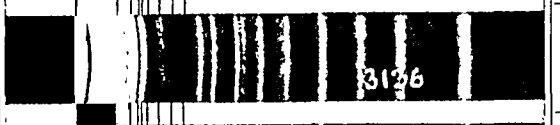
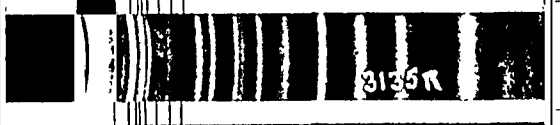
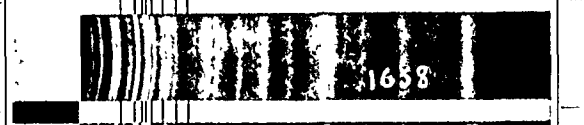
MIXED MINING EXPOSURE

Fig. 6

45	1 year tin mine, England 2 years Sudbury 9 years Porcupine	88	Early silicosis No tuberculosis		450	Soda feldspar+++ Quartz++
58	7 years Sudbury 7 years Porcupine	67	Early silicosis No tuberculosis		1470	Quartz+++ Potash feldspar+ Mica+
48	1 year Pyrite mine 1 year Sudbury 12 years Porcupine	7	Early silicosis No tuberculosis		3120	Quartz++++ Potash feldspar trace Soda feldspar trace Mica+ Tremolite tr
40	3 years Cobalt 12 years Porcupine	84	Marked silicosis Tuberculosis		520	Quartz+++ Mica++ Potash feldspar trace

MIXED MINING EXPOSURE

Fig. 7

66	1 year Kirkland Lake 18 years Cobalt	78	Marked silicosis Tuberculosis		1780	Quartz++ Soda feldspar++ Mica+
52	6 years Kenora	42	Silicosis Tuberculosis		680	Quartz++ Potash feldspar++ Talc trace
57	3 years gold mine B.C. 8 years Cobalt 8 years Kirkland Lake	75	Early silicosis No tuberculosis		4210	Quartz+++++ Mica+ Potash feldspar trace
50	3 years gold mine Nova Scotia 14 years Kirkland Lake	66	Silicosis Tuberculos's		2620	Quartz+++ Mica+++ Soda feldspar+ Talc trace
43	5 years Sudbury (rock house)	18	No silicosis Tuberculosis		210	Soda feldspar++++ Quartz+++ Talc trace
57	18 years coal mine, Scotland 3 years Cobalt 5 years Kirkland Lake	3	Early silicosis Tuberculosis		3080	Soda feldspar++++ Quartz+++ Mica trace
57	18 years pyrite 1 year feldspar 2 years gold	31	Silicosis Tuberculosis		2440	Quartz+++ Mica+++ Albite+

IMPORTANT MINOR POINTS IN LOCAL ANÆSTHESIA*

BY P. D. WOODBRIDGE, M.D., F.A.S.A.

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SUCCESS and failure in local anæsthesia often depend on several seemingly unimportant factors which are frequently overlooked. An otherwise excellently administered block may fail to produce satisfactory results if one or more of these are neglected.

PRELIMINARY MEDICATION

As a foundation on which to start, the patient should be effectively narcotized. Regional and local blocks do not always completely abolish pain impulses, and the injection of the solution itself is likely to be painful. For these reasons morphine or some other dependable *pain-relieving* drug should be given in doses that are rather liberal as compared with those ordinarily used before spinal, ether, or cyclopropane anæsthesia. On the other hand the doses of drugs used to *allay apprehension*, such as scopolamine and the barbiturates, should be small, for example 0.2 mg. (1/300 gr.) of scopolamine with 0.1 gm. (1½ gr.) of pentobarbital sodium (nembutal) for a middle-aged adult of good vigour. If larger doses of either of the latter drugs are used the patient is likely to be disoriented, and if pain impulses are not completely blocked he may become delirious and uncontrollable. Since the barbiturates also protect against the *convulsive effect* of the intravenous injection of local anæsthetics they should never be omitted.

If the metabolic rate is high it may be expected that responsiveness to pain stimuli will be correspondingly exaggerated. Therefore the doses of all of these drugs should be increased above the average for the youthful patient, for the unusually muscular or vigorous, and for those afflicted with fear, with fever, or with thyroid toxicity. On the other hand they should be decreased if the metabolic rate and reflex activity are low. This occurs in infancy and old age, and in the presence of anæmia, myxœdema, prolonged invalidism, or weakness from any cause. The same principles of altering doses apply to all narcotics and anæsthetics under all circumstances of administration.

DRUGS

Procaine (novocaine, neocaine, etc.) has earned its popularity through many years of satisfactory use. *Metycaine* has been used in several hundred cases at the Lahey Clinic, and thus far seems to be superior to procaine; anæsthesia appears to develop more rapidly and surely, to be more intense, and to last longer. Furthermore, its toxicity clinically appears to be no greater than that of procaine. It may be used in the same strengths and amounts as procaine, but it is probable that weaker solutions could be used.

SOLUTIONS

Half per cent and occasionally 1 per cent solutions of either procaine or metycaine are used for local infiltration and for field blocks, and 1 and 2 per cent solutions for nerve blocks. The solvent should be physiological saline, to avoid the pain produced by a hypotonic vehicle such as distilled water. The solution should be warmed to body temperature, because, if cold, anæsthesia will be slow in developing, and, if too hot, anæsthesia is likely to be brief and toxic effects are likely to occur. The anæsthetist will usually have to depend on attendants to give him the saline, but he should add the anæsthetic and vasoconstrictor drugs himself, taking them from manufacturers' labeled ampoules or from some other reliable source. When this rule has not been followed I have observed a nurse pouring epinephrine solution from a bottle into a solution of procaine instead of carefully measuring it, and I have known surgeons who have asked for procaine solution to receive 20 per cent solution of procaine, 30 per cent solution of sodium chloride, or even 95 per cent alcohol. The pain of the alcohol injection was severe, and the strong solutions of procaine and of sodium chloride caused serious sloughs. It is probable that a considerable portion of so-called procaine fatalities have really been from cocaine unwittingly given.

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* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Surgery, Ottawa, June 23, 1937.

From the Department of Anæsthesia, Lahey Clinic, Boston, Mass., U.S.A.

TOXICITY

Most texts fail to differentiate between the toxic effects of the local anæsthetic on the one hand and of the vasoconstrictor drug on the other. The profession is indebted largely to Lundy for drawing attention to the distinction. The *gradual absorption* of the local anæsthetic from the tissues causes a drop in blood pressure, also pallor and sweating, and in more severe cases nausea, vomiting and respiratory depression. The condition should be treated by giving a vasoconstrictor drug and oxygen. The development of such toxicity is dependent on rapid absorption of the drug into the circulation. The speed of absorption, and therefore the likelihood of the occurrence of toxic effects, is greater with larger amounts of the anæsthetic drug than with small, with stronger solutions than with weak, with hot solutions than with cold, and with rapid injection than with slow. Absorption is also more rapid from regions well supplied with blood vessels, for example, from the gums and from the sacral canal. The accidental *intravenous injection* of a sufficient quantity of a local anæsthetic produces primarily a very different effect, namely, convulsions. These may or may not be accompanied by the foregoing signs. The preliminary use of a barbiturate tends to prevent convulsions, and treatment consists in the intravenous administration of a barbiturate and the inhalation of oxygen.

The undesirable effects produced by *epinephine* are very different from the foregoing. A subjective sense of fear is probably the first effect to develop. The patient is thus plunged into the worst possible emotional state to undergo an operation under local anæsthesia. Objective effects consist of a rise in blood pressure and of pulse rate, pallor, and a fine fibrillary tremour of the skeletal muscles. In severe cases there may be a sense of constriction around the chest. Further injection should be delayed until these signs and symptoms have subsided. This usually occurs in 12 to 15 minutes. The injection may then be continued with a solution containing much less of the vasoconstrictor drug. In case of severe toxicity oxygen may be of benefit.

Occasionally toxic effects may be due to rapid injection or intravascular injection. It is likely, however, that most cases of toxicity from local anæsthesia are in reality not from the anæsthetic drug but from excessive amounts of epinephrine in the solution. With patients who state that they do not tolerate local anæsthesia well my experience has agreed with Lundy's, namely, that if very small amounts of epinephrine are used and the injection is made slowly no trouble develops.

The toxicities of local anæsthetics and of vasoconstrictor drugs are largely antagonistic. A careful balancing of the dosage might therefore *balance the antagonistic actions*. Farr and Lundy have advised using less epinephrine than is customary, and I have still further reduced the amount, with the result that even slight degrees of toxicity from either the local anæsthetic or the vasoconstrictor drug occur very infrequently. The amount that has proved satisfactory is 0.2 mg. of epinephrine (0.2 c.c. of 1:1,000 solution) for each gm. of the anæsthetic drug, whether it be procaine or metycaine. (One gm. of the anæsthetic is the amount contained in 100 c.c. of 1 per cent solution or in 200 c.c. of 0.5 per cent solution). This proportion corresponds roughly to 1 minim per ounce of 1 per cent solution, a strength merely a fraction of that commonly used in general and in oral surgery. With this proportion anæsthesia has lasted sufficiently long. New derivatives of epinephrine and of ephedrine are being subjected to experimentation and clinical trial. It is possible that one of these will be found to give better local vasoconstriction with less toxicity than the drugs formerly available.

The question is often asked, "What is the *total amount* of solution that may safely be used?" From the foregoing discussion it is evident that no dogmatic answer can be given. The anæsthetist should always be on the lookout for the signs of toxicity already enumerated, and would do well not to inject more than 80 c.c. of 1 per cent solution or 200 c.c. of 0.5 per cent solution without a pause of 10 minutes to allow signs of toxicity to develop.

APPARATUS

The syringe should be of glass, so that aspirated blood may be seen. A capacity of 10 c.c. is convenient. The nipple should be eccentric, so that needles may lie immediately beneath the skin throughout their full length without being bent. For the sake of dexterity in handling there should be rings for two fingers and for the thumb. The needles should lock on to the nipple with not more than a half turn. The

bevels of the needles should be rather short, and so ground that they face at right angles to the plane of the rings of the handles when they are in locked position. Suitable lengths are 2, 5, and 8 cm. (approximately ¾ in., 2 in., and 3½ in.). It is convenient to have them of rustless steel so that they may be boiled in a metal box with their syringe and kept sterile, ready for use.

TECHNIQUE

There are several neglected points of technique that are applicable to many types of injection. Lundy and McCusky have shown that if skin *wheals* are to be made less painfully the needles should be held in a manner contrary to that described in most texts, namely, with the bevel facing down rather than up. The underlying factor in the advantage of this position may be that the anæsthetic solution can be injected into the skin as soon as the tip of the bevel pierces it, whereas if the bevel faces upward its entire length must be buried in the skin before injection can take place (Fig. 1). The smallest gauge needle should of course be used.

The *bevels* of the larger needles may be thought of as runners or skids. If the anæsthetist wishes the needle to slide along under the skin or over the surface of a bone the bevel

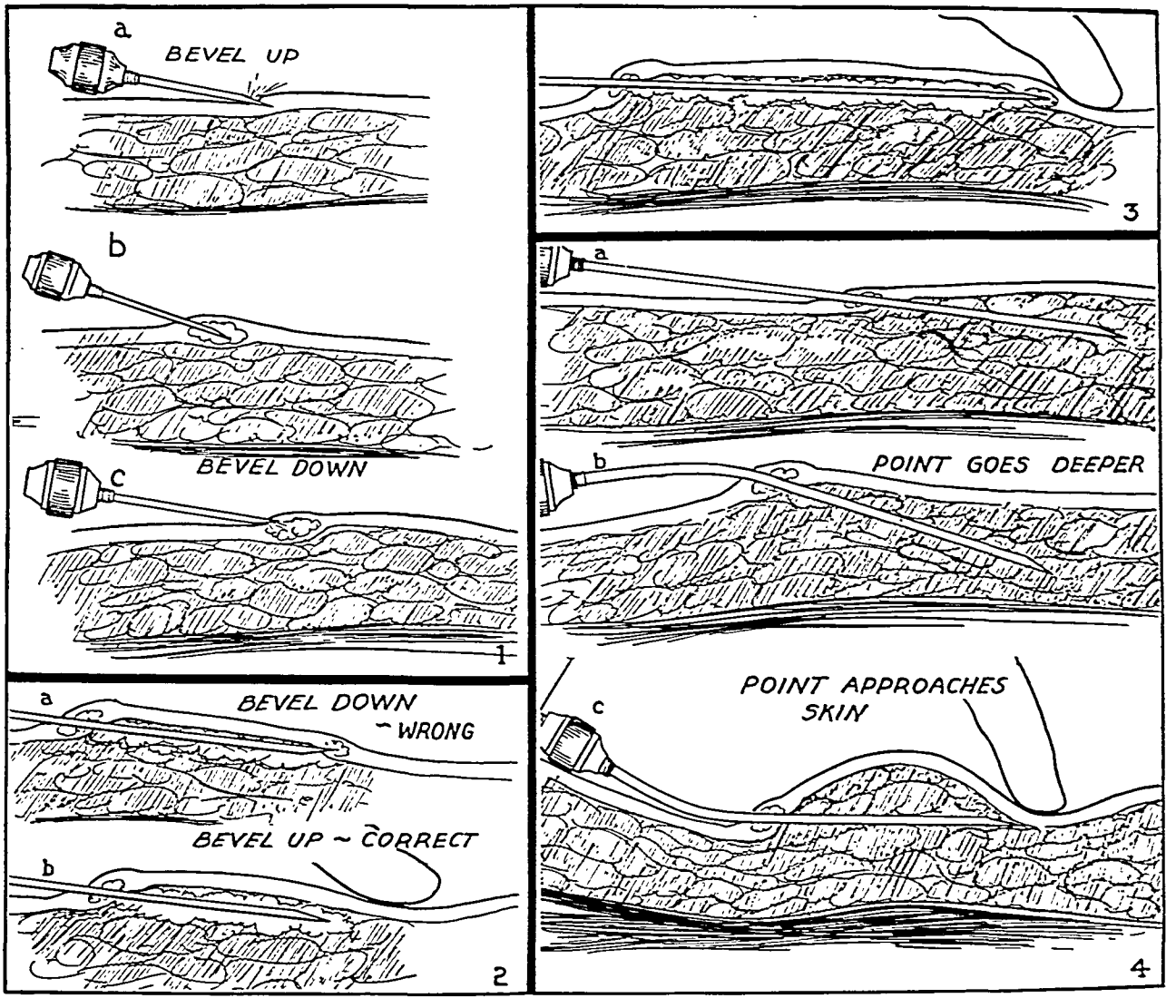


Fig. 1.—RAISING WHEALS. With bevel up (a and b) the entire length of the bevel must be buried in the skin before solution can be injected. The prick is less painful with the bevel down (c); solution can then be injected before the entire length of the bevel is buried. Fig. 2.—THE BEVEL AS A SKID. For subcutaneous injection the bevel should face up (b), so that the point will be less likely to catch in the skin (a). THE FOREFINGER AS A GUIDE (b). The left forefinger senses and regulates the depth of the point of the needle. Fig. 3.—RAISING A SECOND WHEAL. The forefinger forces the skin on to the point, to raise a wheal for the next entry of the needle. Fig. 4.—HOW TO BRING POINT NEARER THE SURFACE. When the point of the needle is deeper than desired (a), tilting the syringe upward merely sends the point deeper (b). The skin should be depressed in front of the point (c), and the syringe, if slanted at all, should point downward.

should face toward the skin or bone so as to serve like the forward upturned end of a sled runner; otherwise the point may catch in the skin or periosteum (Fig. 2).

The *forefinger* of the left hand serves as a very helpful guide during subcutaneous injection. It palpates the skin just ahead of the point of the needle, senses just how deep the point is, and depresses either the point of the needle or the skin ahead of the needle to keep the point at just the right depth (Fig. 2). At the end of a subcutaneous needle stroke it forces the skin on to the point of the needle so that a *second wheal* may be raised from below, to make the next entry of the needle painless (Fig. 3). During the course of a subcutaneous injection, if the point gets too deep the natural tendency is to attempt to bring it nearer to the surface by pointing the syringe upward. However, this merely so curves the needle that its point goes deeper (Fig. 4). Instead, the skin in front of the point should be depressed by the forefinger, and if necessary the syringe may be pointed down also.

To avoid the *intravascular injection* of any considerable amount of solution either the needle

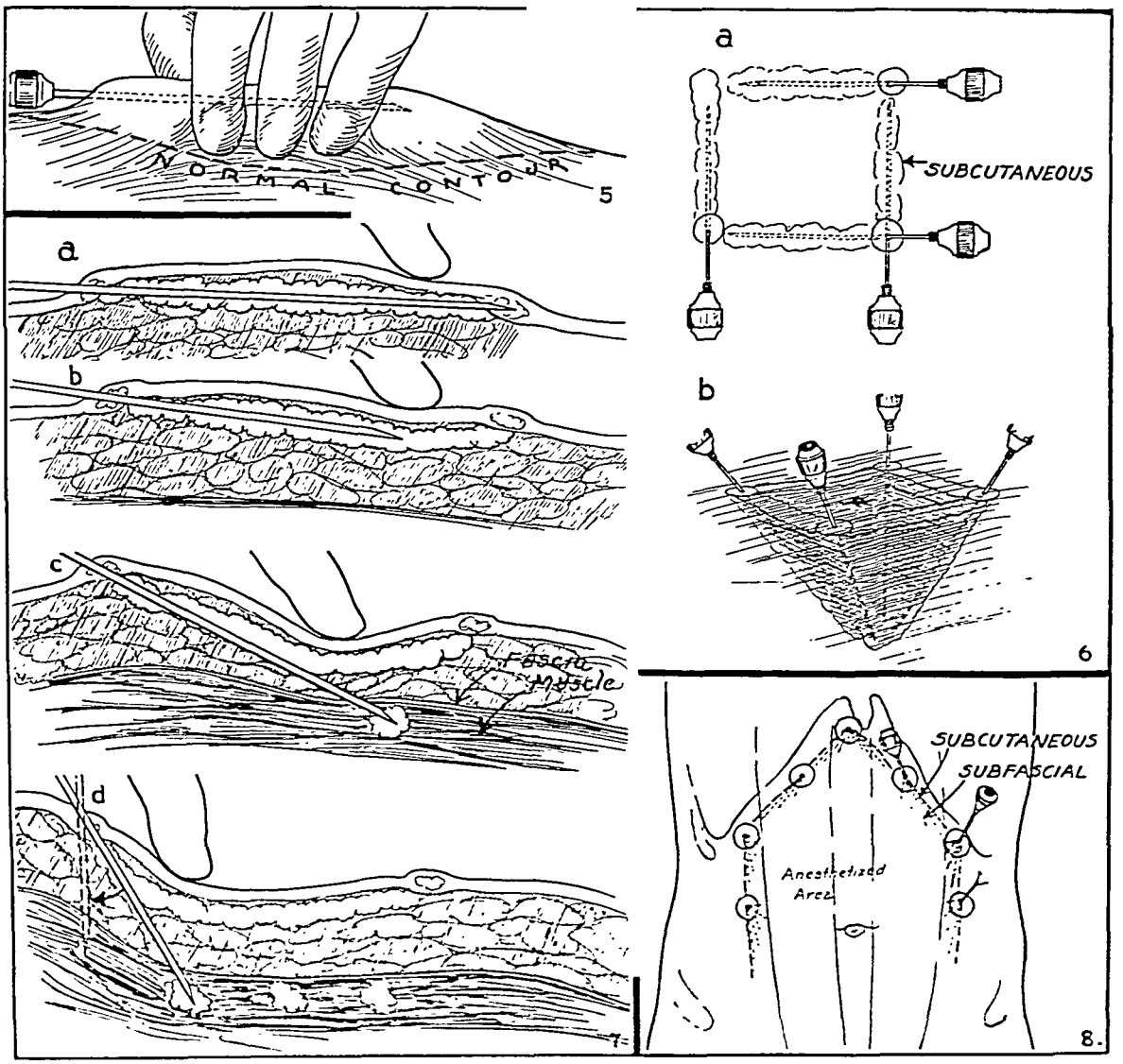


Fig. 5.—SUBCUTANEOUS INJECTION IN A CONCAVE AREA. To avoid bending the needle, the anæsthetist lifts the skin until its surface is straight. Fig. 6.—FIELD BLOCK AROUND AND UNDER A SUPERFICIAL LESION. A wall of anæsthetic solution isolates the lesion. Fig. 7.—ABDOMINAL FIELD BLOCK. At the end of a subcutaneous line of injection a wheal is raised from below. The left forefinger is then moved back 2 cm. (a), the point of the needle is withdrawn until it is felt beneath the forefinger (b), it is thrust through the fascia, and 2 c.c. of solution are injected (c). This manœuvre is then repeated three times (d). Fig. 8.—ABDOMINAL FIELD BLOCK. In this case there are eight of the units shown in Fig. 7.

should be kept moving or frequent aspiration should be made. Not more than 1 c.c. of 1 per cent solution should be injected with the needle stationary unless the aspiration test is performed. I have seen as much as 40 c.c. of 0.5 per cent procaine injected into a patient's neck without aspiration and without any change in the needle's position. Such practice is dangerous, and may account for some of the deaths that have occurred under local anæsthesia.

As a precaution against *breaking needles,* they should not be curved but should be kept straight whenever possible. For subcutaneous injection in a concave area the skin should be pulled up into a straight line so as to conform to the straight shaft of the needle (Fig. 5). The second precaution is to avoid inserting the needle as far as its hilt, for it is then very likely to break at the junction of shaft and hilt. This rule does not apply when the entire length of the shaft lies immediately beneath the skin. In the third place, when the point of the needle is firmly held by deep structures, care must be exercised not to bend it by pulling the skin to one side or the other at the point where the needle has pierced it. I have seen a needle snapped off as if it were a splinter of dried wood when the point was in a sacral foramen and the anæsthetist was searching for a second foramen with another needle.

For *field block of superficial lesions* an equilateral quadrangle of subcutaneous injections may be made around the lesion, and the needle may then be inserted through the wheal at each corner of the quadrangle and slanted towards a point directly underneath the centre of the lesion. In this way a cone-shaped wall of solution may be deposited under and around the lesion (Fig. 6).

For *abdominal field block* the location of the wall of anæsthetic solution will depend on the site of the proposed incision. It may advantageously be built of units formed as shown in Fig. 7. A skin wheal is raised with the 2 cm. needle, and then with the 8 cm. needle subcutaneous injection is made extending the whole length of the needle, and a wheal is raised from below at the end of the stroke. The left forefinger is then placed over the shaft of the needle, 2 cm. from its point, the needle is withdrawn until the point is felt to lie directly under the finger, and the needle and syringe are then tilted so that the needle points diagonally towards the abdominal cavity; it is inserted through the fascia, which in vigorous subjects is felt like a rubber membrane, and 2 c.c. of solution are injected. This manipulation is repeated until 4 such deep injections, evenly spaced, have been made under the 8 cm. line of subcutaneous infiltration. A second similar unit is then started by inserting the needle through the wheal raised at the end of the first needle stroke. Successive units are made until the required wall of anæsthetic solution has been completed (Fig. 8). Each unit requires about 10 c.c. of solution. To ensure satisfactory anæsthesia the entire injection should be repeated, so that 160 c.c. would be used in all. This type of injection along the anterior costal margin or the lateral border of the rectus muscle produces anæsthesia of all structures, from skin to peritoneum inclusive, in the area medial and slightly inferior to the line of injection.

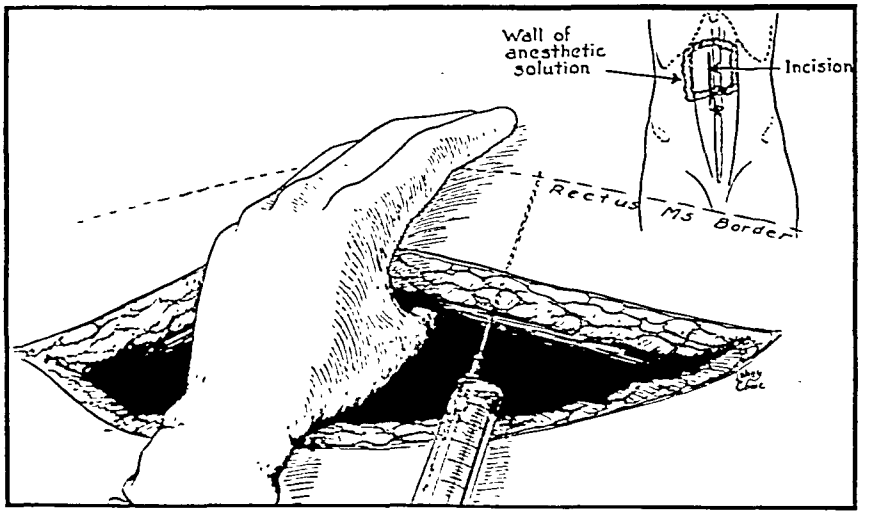


Fig. 9.—ABDOMINAL FIELD BLOCK AFTER INCISION. A wall of anæsthetic solution is built up along the lateral borders of the rectus muscles and above and below the wound.

If an abdominal operation is to be done under light general anæsthesia and field block, the surgeon may wish to inject the local anæsthetic solution after the patient is asleep. In the case of a midline or rectus muscle-splitting incision this may be done most easily after the abdomen is opened. With his left hand the surgeon lifts the cut edge of the abdominal wall (Fig.

9), and with the syringe in his right hand inserts the needle until its point reaches the lateral border of the rectus muscle. After each injection of 2 c.c. the needle is withdrawn slightly and reinserted with the point a little more cephalad or caudad than it was before, and with each filling of the syringe the needle is entirely withdrawn and reinserted in a new location. Common faults are to inject too near to the wound edges, to skip certain areas, including those at the ends of the wound, and to use not enough solution. The anæsthetic should be deposited at the lateral borders of the rectus muscles, the wall of solution should extend entirely around the wound, and between 120 and 180 c.c. of solution should be used. In the cases in which 0.5 per cent metycaine has been used in this manner marked relaxation of the rectus muscles has developed with surprising rapidity.

SUPPLEMENTARY ANÆSTHESIA

Honesty must be the rule in deciding whether an injection has really produced anæsthesia. Though they belong to a phase of my life long past, I remember vividly the agonized groans of a friend, a physician, when his rib was being resected for empyema. Circumstances were such that I could not go to his aid. The next day the surgeon met me and said, "I did Dr. F. under local anæsthesia yesterday. It was perfect—he didn't have a bit of pain." When anæsthesia does not follow the injection of the solution we must be ready to supplement by other methods.

SURGICAL TECHNIQUE

The best local anæsthesia may be rendered utterly futile if the surgeon uses a technique adapted only to spinal or to deep general anæsthesia. The patient loses all confidence and becomes a prey to adrenin over-secretion if a towel clip is put through the skin beyond the anæsthetized area. The surgeon should ask for a "scalpel", not for "the knife". Sharp dissection should be used rather than blunt. Pressure and traction should be avoided, and sponging should be done with the greatest of gentleness. The edges of an abdominal wound should be lifted upwards rather than retracted laterally. Only those surgeons who are willing to adopt the necessary gentleness and nicety of technique required by local anæsthesia should attempt to work with it.

SUMMARY

The several points of technique that have been described are applicable to many types of local anæsthetic injections, and have been found helpful in developing dexterity and in attaining success through more careful placement of the solution. The use of metycaine instead of procaine appears to make failures less frequent. With minimal quantities of epinephrine patients are much more comfortable than with the amounts customarily used, and marked toxic effects are rarely produced. Good preliminary narcosis is a *sine qua non* of success. It should relieve pain and fear, yet avoid producing delirium.

LEUKÆMIC BLOOD FOR AGRANULOCYTOSIS. — T. Deglmann was encouraged by Bock's recent experience in the treatment of agranulocytosis with the transfusion of blood from a case of myeloid leukæmia to repeat this experiment in an apparently desperate case of his own. His patient was a woman, aged 28, who on admission to hospital was partially unconscious and suffering from high fever and a progressive necrotic stomatitis. The clinical diagnosis of agranulocytosis was confirmed by a blood count, which showed only 1,200 leucocytes per c.mm. There were no granulocytes, monocytes, or eosinophiles, and only a few lymphocytes. The prognosis being very bad, 500 c.c. of blood were transfused from a man, aged 39, who suffered from myeloid leukæmia and belonged to the same group as the recipient of his blood, which showed 200,000 leucocytes per c.mm. The transfusion was well tolerated except for an attack of shivering, and it was repeated after a short interval, 500 c.c. being again injected, this time without any reaction. The leukæmic donor was compensated for his loss of blood by a transfusion of normal blood from the patient's mother. The author is inclined to attribute his patient's recovery to the receipt of 1,000 c.c. of leukæmic blood, of which the leucocyte content was equivalent to that of 40 litres of normal blood.—*Dtsch. med. Wschr.*, November 5, 1937, p. 1694. Abs. in *Brit. M. J.*

THE CYCLOTRON AND ITS CONTACTS WITH X-RAY AND RADIUM THERAPY

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1. INTRODUCTION

EARLY in the present year McGill University decided upon the erection of a radiation laboratory and the installation of a cyclotron. The object of the present article is to review briefly the chief characteristics of this powerful research tool of the physicist and to indicate some of the points of contact which the new field of activity has already made with x-ray and radium therapy. Upon examination of the facts it is found that, while the cyclotron (through artificial radioactivity and neutron radiation) opens the door to an enormous range of new research activity in the physical and biological sciences, some of the older procedures based upon x-rays and the natural radioactive substances may be retained with value unimpaired.

As demonstrated by Rutherford more than a quarter of a century ago, each atom has a compact and very tightly bound structure at the centre (called the nucleus) and a relatively loose outer structure of electrons. Changes in the nucleus result in radioactivity, while changes in the outer atom may produce the spectrum or other ordinary physical or chemical activity. A great contrast, however, results from the fact that the speed of particles emitted in natural radioactivity is such as may be matched artificially only by the application of millions of volts to such particles, whereas changes in the outer structure commonly amount to only a few volts. Thus a low voltage is sufficient to excite the optical spectra of the elements, but it may require millions of volts to produce a certain change in a given nucleus. And for this general reason the spectra and other physical and chemical changes have become well known through experiment, while for lack of high voltage equipment most nuclei have remained "duds" through the centuries. It is true that a few naturally radioactive nuclei have revealed the character of some of the possible nuclear changes, but of course only those changes which take place when these nuclei progressively tumble down from unstable forms to stable inert conditions. Some additional characteristics were brought out by a series of experiments initiated by Rutherford, who first by design changed a nitrogen nucleus into one of oxygen. This was done by bombardment of nitrogen gas with the fast alpha particles (helium nuclei) emitted in natural radioactivity. The alpha particle was caught, and from the resulting complex structure a proton (simple, light hydrogen nucleus) was immediately released. Similar results were obtained by alpha bombardment of other light elements, yet in the case of beryllium Chadwick discovered that a new particle, the neutron, was set free. Since this particle (which is only slightly heavier than a proton) *carries no electric charge*, it is not retarded in its progress through matter unless by direct collision with other nuclei. When such collisions do take place, however, the neutron may enter into the nucleus, since it is not opposed by the very strong electrostatic forces experienced, *e.g.*, by the alpha particle or proton. This newly discovered particle does indeed enter most nuclear forms it encounters. Thus is formed in many cases an unstable and therefore radioactive nucleus of the chemical element under bombardment. This has been studied by Fermi following the discovery of artificial radioactivity by Curie and Joliot through alpha bombardment of boron.

The object in tracing briefly the origin of artificial radioactivity is to stress the fact that while the cyclotron is by all odds the best source of artificially radioactive substances it is not the original source. But, having said this, it must in justice be added that new and important types of nuclear reactions have been discovered by means of the cyclotron, and further fundamental progress of this nature may be expected.

2. DESCRIPTION OF THE CYCLOTRON

Invented by Professor Ernest Lawrence, of California, for the production of high speed ions of hydrogen and helium, the cyclotron enables one to reach this objective by *successive accelerations* of the same ions with the same moderate voltage. The instrument is based on the fact that an ion circling in a plane perpendicular to a magnetic field makes the circuit in the same time, no matter what its linear velocity. The angular velocity is constant. Thus an ion circulating in such a field may be repeatedly accelerated by successive applications of about 40,000 volts from a radio oscillator with which the ion remains in resonance. In this way Lawrence has been able to give to heavy hydrogen ions a speed which might be expected from a single application of seven and a half million volts.

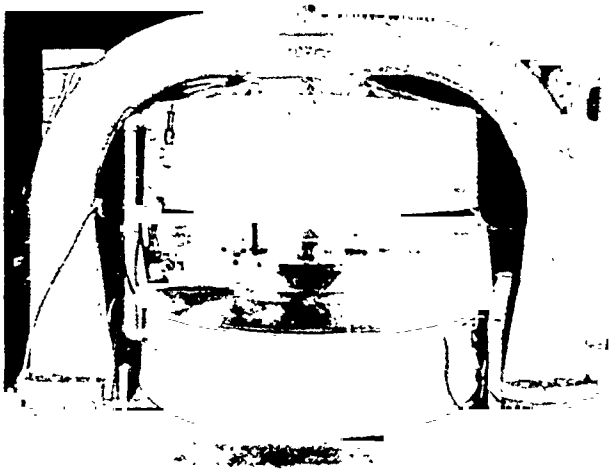


Fig. 1.—General view of the Berkeley cyclotron.

Looking now into more details, it may be said that the present preëminent position of the cyclotron as an artificial source of fast particles was established by the Berkeley model shown in Fig. 1. Round the outside is the yoke of the eighty-five ton electromagnet (bottom section below floor level). The coils for excitation are in the large tanks, which are fitted for oil cooling. Between the oil tanks the pole pieces may be seen, and filling the gap between the poles is an evacuated metal chamber in the form of a shallow pill box. It is in this chamber, or "tank", that the ions are accelerated.

A somewhat simplified horizontal cross-section of the tank (which usually contains heavy hydrogen at very low pressure) is given in Fig. 2. A and B are the halves of a thin hollow copper pill box, and are insulated from each other as well as from the tank case. They help to form the condenser part of a radio circuit which is coupled to the radio oscillator as shown in the diagram.

For a simple discussion of the operation of the cyclotron, suppose that a heavy hydrogen ion (deuteron, or proton and neutron bound together) is formed at P when the maximum negative potential is impressed on A. The ion will be accelerated and due to the magnetic field will be drawn round the initial half circle of the apparent spiral, as indicated. Now the frequency of the oscillator and strength of magnetic field are so chosen that when the ion again reaches the gap between the electrodes B is at maximum negative potential and the ion gets a second acceleration by the same voltage. This process continues for seventy-five or more revolutions, the ion keeping in step with the oscillator and consequently getting an additional energy of, say, 40,000 volts each time

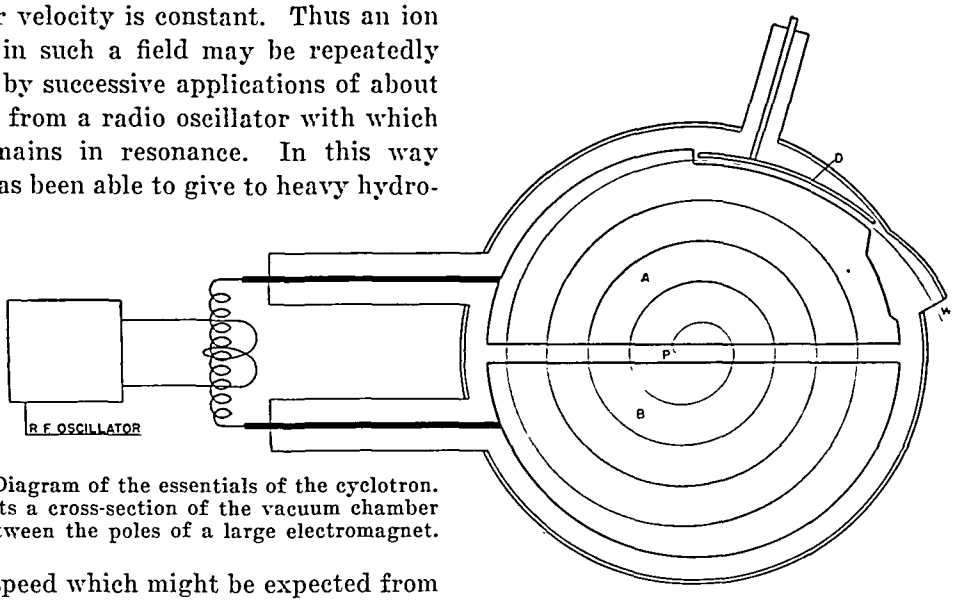


Fig. 2.—Diagram of the essentials of the cyclotron. This represents a cross-section of the vacuum chamber which fits between the poles of a large electromagnet.

it crosses the gap. By this time, we shall assume, the spiral has opened up to the limit permitted by the size of the accelerating electrodes, and the ion is therefore drawn off its circular track by about 40,000 volts applied to the deflecting electrode, D. Eventually such ions strike the target with an energy of five and a half million volts, or they may pass through a thin platinum window at W, and come out into the air to produce a bright blue beam about 20 cm. long.

3. Cyclotron Beam Compared with Natural Radioactivity

Let us now compare the beam from a cyclotron with natural radioactivity. In the first place, hydrogen nuclei are not emitted by radioactive substances found in nature; the beam just described is novel therefore as regards quality. In the second place, Lawrence has found that the number of fast particles supplied by his cyclotron in full operation is equal to the number of particles (of a different kind) emitted in the same time by 2,500 grams of radium. That is to say, the intensity of the primary cyclotron beam is enormously greater than that from any natural radioactive source. On the other hand, if helium gas is used in the vacuum chamber of the cyclotron it is possible to accelerate doubly ionized helium atoms (alpha particles) and so obtain a directed beam of the same general quality as the alpha radiation dispersed in all directions by radium and its products. Owing to the relative difficulty of securing double ionization, however, the beam is then of rather low intensity, and under present conditions at Berkeley corresponds to the alpha activity from fifteen grams of radium. The energy of the alpha particles is eleven million volts. Finally, it may be pointed out that the greatest value of the cyclotron appears to lie in the fact that the deuteron beam may be used to produce surprisingly strong beams of neutrons. The Berkeley cyclotron, when run with a beryllium target, supplies a neutron beam equivalent to that which theoretically might be produced by somewhat more than one hundred pounds of radium in a beryllium mixture. This neutron beam has been used at Berkeley directly as a new radiation in radiotherapy, and as such it will be discussed later. In addition, it is used for the direct bombardment of the chemical elements and the consequent production of new radioactive nuclear forms of all except the lightest elements. It follows from the above that for either purpose the cyclotron is incomparably superior to any radium-beryllium source now available or contemplated for the future.

We cannot in this brief article stop to review all the means of producing artificial radioactivity, or to consider in detail the relative importance of each method. But, in addition to (1) the neutron beam just mentioned, it may be said that (2) the deuteron beam itself will activate most targets and that (3) artificial alpha particles and (4) protons are effective on many targets of low to medium atomic number. Moreover, (5) owing to release of internal energy, neutrons from a lithium target bombarded by deuterons have an energy of 15 million electron volts, and these fast particles are especially apt to knock two or more neutrons from the bombarded nucleus. By this means radioactive nuclear forms are produced which are characterized by a lower mass than the stable nuclei of the same element. Already more radioactive than stable nuclei are known.

4. Neutron Radiation and Neutron Therapy

The new researches which are based on the cyclotron represent an especially wide range of interests, and are further characterized by the fact that the path from purely scientific investigations to practical applications is uncommonly short. Let us consider first what has been learned about the behaviour of neutron radiation and about neutron therapy. Owing to the absence of charge the neutrons pass through solid matter in much the same way as x-rays. They are nevertheless deflected from a straight path by direct collision with nuclei. If the impact is heavy (tennis-croquet collision) the neutron will change its course but will continue with nearly as much energy as before. If the collision is with a light nucleus, *e.g.*, the proton or hydrogen nucleus (tennis-tennis collision) the neutron is then able to put the proton in rapid motion and the energy is on the average nearly evenly divided between the two particles. Consequently, in the presence of hydrogen, as first realized by Fermi, neutrons may be slowed down to thermal velocities, the number of collisions required being as a rule 25 to 30. Any material which contains a high concentration of hydrogen

is suitable for this purpose. Paraffin cylinders of about 10 cm. radius are convenient round a radium-beryllium source, while water tanks are used in the larger installations round the cyclotron. Water two feet thick will slow down and stop all the neutrons. Returning now to the thermal neutrons, there arises the curious picture of neutrons swarming round a laboratory with little more than the velocities of light gas molecules. Even at such low speeds they succeed in penetrating the nuclei of neighbouring atoms, for there is no electrostatic repulsion. In this process, certain nuclei present an especially large cross-section for neutron capture, *e.g.*, boron, cadmium, and a few other nuclear forms scattered at random through the periodic table. The boron becomes radioactive (emitting alpha particles), and is therefore often used as a test for the presence of neutrons. The cadmium does not become radioactive,* and since a one-half millimetre thickness stops slow neutrons it is commonly used as a slow neutron screen.

It follows that when fast neutrons are allowed to pass into a biological body they of course encounter hydrogen nuclei (protons) which they put in rapid motion. Since the protons carry a positive charge they do not readily pass through matter; in fact they produce a very heavy ionization along a short path of the dimensions of several cells. This ionization (destructive action) is hundreds of times more dense than that caused by the comparatively long-range electrons put in motion in normal x-ray treatment. Doubtless this is the reason that the dosage for a given biological effect is less with neutrons than with x-rays. Through the investigations carried out at Berkeley under the leadership of Professor Ernest Lawrence and his brother Professor John Lawrence, a medical doctor, it has been learned that the ratio of x-rays to neutron dosage varies somewhat with the tissue and is commonly about five to one. Of course the above remark implies that one type of radiation will differentiate between two tissues better than the other. It has long been known that when x-ray ionization is of sufficiently low density repairs may be made in the tissues and no permanent damage results; in addition, it is known that when the density of ionization is sufficient to cause destructive action, the effects on young cells and on malignant cells are greater than on the older normal cells. In comparative tests made with tumour implants (Sarcoma 180) and with normal mice under both radiations it was learned[1] that neutron radiation makes the better differentiation between these two tissues. Although the experiments to date are too limited to permit one to reach a final conclusion regarding the value of neutron therapy they are most encouraging, and make it quite clear that the subject must be thoroughly studied.

Before passing to other topics it should be noted that the neutron radiation so far available is very weak compared with an ordinary x-ray source, and hence comparisons have been made only on mice or even smaller objects placed very close to the target of the cyclotron. One of the problems now receiving serious consideration at Berkeley is that of making a much stronger neutron source in order to treat hospital patients. Finally, it may be emphasized again that only fast neutrons can produce the above effects. Neutrons which have passed through less than a foot of water would have energies much too low for this action.

5. RADIO SODIUM *vs.* RADIUM

During the past months there has appeared in the public press from time to time the suggestion that some of the new nuclear forms, especially radio sodium, may offer the radium industry serious competition. This point is worthy of more careful consideration. It is clear that artificial radioactivity will permit marked extensions to the work in radiotherapy—and especially so since many of the new forms are quite harmless if injected directly into the blood stream—but it is not yet clear that radium as now used in the larger units can be generally replaced by any new material. It is of course now well known that the largest units of radium are in the form of sealed "bombs" (upwards of 5 grams) which serve as gamma-ray sources for the treatment of tumours. A strong source is essential to get the necessary effect at an appreciable depth without burning the surface tissue. Now at present it is not possible to prepare radio-sodium bombs of one-fifth this intensity, and one would indeed be optimistic to predict the early delivery of artificial bombs of this strength to distant Canadian points.

* Gamma rays are emitted by newly formed cadmium nuclei.

Since the activity of sodium falls off to half value in 14.8 hours, one cannot see clearly that in our generation bombs will be prepared which will show after two days a gamma-ray intensity equivalent to that of a five-gram bomb of radium. Taking into account the fact that even if this objective were realized the sodium bomb would require adjustment from hour to hour to ensure proper dosage, one may say that sodium is not likely soon to be a competitor of radium in respect to therapy in Canada.

In order to visualize a probable extension in radiotherapy, let us consider the character of radio sodium in more detail. This new isotope, of atomic weight 24, is commonly made by deuteron bombardment of sodium metal or sodium salt. The neutron from the deuteron enters the normal sodium nucleus to form the new active product, while the proton is rejected at the time of bombardment. The active sodium nucleus eventually emits an electron (beta ray) and passes to a magnesium nucleus of mass 24. This latter is formed in an "excited" state, but becomes normal immediately with gamma ray emission. As a net result, then, ordinary sodium is turned into ordinary magnesium; but the process includes emission of beta rays of average energy about one-half million volts, and a gamma ray spectrum ranging from one to three million volts. Of course, the magnesium is perfectly harmless in biological bodies; hence the sodium may be put in the blood stream. Hamilton and Stone[2] have taken advantage of these features in the treatment of leukæmia. They hope to secure beneficial results by bringing the radioactive material in close contact with the base of the disease. Since there are a great many new active isotopes which lead to harmless products, and it is known that elements are selectively taken up by different tissues of the body, one may see the possibility of some selectivity in the treatment of given tissues.

6. Radioactive Indicators

Great success may safely be predicted for another phase of biological research already started by means of the cyclotron. Active isotopes are being introduced into biological bodies in order that they may show by their activity the rate of movement and ultimate disposition of the chemical elements represented. This use of radioactive indicators was suggested by earlier work with the radioactive lead found in nature; it is now being extended to many elements of greater biological interest. In this simple application of the products of the cyclotron we are thinking only of the distribution of atoms. Provided the periods of the radioactive forms are sufficiently long, it is obviously possible in certain cases to build up stable molecules of which they form a part and thereafter trace the progress of the molecules. It is scarcely necessary to add that such active molecules could never be formed by placing normal molecules in the beam from the cyclotron. In that case every atom made active would at the same moment receive a blow which would knock it out of the molecular structure.

The above aspects of research based on the cyclotron have been selected as possibly the ones of most interest to readers of the *Journal*. The sketch is clearly not intended as a representation of the major interests which will guide research in the Radiation Laboratory at McGill. The new establishment will form an addition to the Physics Department, and it is otherwise evident that fundamental work in nuclear physics must receive proper development. It is hoped that a 150-ton cyclotron will be in operation one year from now.

The appended list of selected books and papers is suggested as a guide to readers who wish more detailed information regarding the cyclotron itself or the biological or other researches based upon it.

Illustrations were received through courtesy of Dr. F. N. D. Kurie and the *General Electric Review*.

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THE ORGANIZATION OF A RHEUMATISM SERVICE*

BY H. L. BACAL, M.D. AND R. R. STRUTHERS, M.D.

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RHEUMATISM in childhood has been for many years one of our great problems in Montreal. The temperate climate, with its sudden changes in weather, the social and environmental conditions of the poorer classes, and perhaps the type of homes occupied by these unfortunate children, has made this city one of the largest centres of rheumatic infection in childhood on this continent. The crippling effects of this disease can certainly be compared with those of other chronic diseases such as tuberculosis and syphilis. We have felt that rheumatism, once it becomes chronic, behaves similarly to tuberculosis and should be treated in the same manner as this chronic disease. Attacks of the various manifestations of the rheumatic cycle may recur periodically, and one attack predisposes to another. We have found, as others have, that the largest number of cases occur in the spring of the year and that the females affected outnumber the males. There is frequently a familial history of rheumatism, and the infection is uncommon under five years of age.

It is interesting that nearly all the systems of the body may be involved in this disease. The respiratory system is represented by tonsillitis, pneumonia, and pleurisy; the articular system by arthritis and bursitis; the nervous system, by chorea; the cutaneous system, by subcutaneous fibroid nodules, erythema multiforme, and occasionally erythema nodosum; the cardiovascular system, by carditis, purpura and epistaxis; the ocular system, by episcleritis; and the gastro-intestinal system, by peritonitis. These manifestations vary from time to time, and an exacerbation of any one or other of these may occur.

From study we have formed the opinion that rheumatic infection in childhood may be divided into four group types, namely:

1. *The unwell child* of poor physique, subject to recurrent respiratory infection, giving a history of "growing pains"; with no definite evidence of any of the rheumatic manifestations, yet a potential candidate for rheumatism, particularly if there is a family history of this disease.

2. *Sydenham's chorea,* nervous manifestations characterized by spasmodic aimless jerky, irregular movements of any or all the voluntary muscles of the body, varying in severity from mild to severe, accompanied by emotional and physical instability, giving such types as chorea paralytica, hemichorea and chorea insaniens.

3. *Acute rheumatic (arthritis) fever,* which is usually not very acute in children, but frequently shows symptoms of inflammation of the periarticular tissues and muscles. The joints usually involved are the ankles, knees, wrists, elbows, fingers, and sometimes the hips. The arthritis is migratory in character, responds to the administration of salicylates with surprising rapidity, and never leads to permanent disability or suppuration of the joints.

4. *Rheumatic carditis,* which is the most frequent and most severe complication of rheumatism, and stands as a spectre over the future of the rheumatic child. It is estimated that from 50 to 60 per cent of the rheumatic patients ultimately develop some heart lesion.

Since it has been our opportunity to see and treat a large number of acute, convalescent, and chronic cases of rheumatism in childhood we have been fortunate, at the Children's Memorial Hospital, in having been able to institute a "Rheumatism Service", so organized that cases are followed and observed if possible from the beginning of the disease, when they are admitted to the indoor service, until they are discharged to their homes and seen periodically in the outdoor department at the cardiac clinic. Patients suffering from acute rheumatism are first admitted to the main hospital and kept there in cubicles, under isolation precautions, until it is certain that there is no complicating infectious condition. During this time a consultation is requested from one of the staff on the "Rheumatism Service". He, in turn, if

* From the "Rheumatism Service" of the Children's Memorial Hospital and the Department of Pædiatrics, McGill University, Montreal.

the case is suitable, accepts the patient for transfer to the rheumatism pavilion.

The rheumatism pavilion is a rectangular stucco building with a large balcony across the front, with sufficient room to put all the children outdoors when the weather permits. It is supplied with abundant light and ventilation by swinging windows which completely surround the ward.



Fig. 1.—Exterior view of "Rheumatism Pavilion."

The pavilion is supplied with high and low pressure steam, the low pressure for radiators. The high pressure is led to two Dunham Unit heaters situated in the basement of the hut, each of which is fitted with a speed motor. A small perforated steam pipe is led into the air trunks, and small jets of steam are driven into the hot air on its way to the ward. This maintains an average of 45 to 55 per cent relative humidity and a constant temperature of 70 to 72° F. One heater is used for each side of the ward. When heat is required the switch is turned on to set the motor and to drive air through the unit heaters, which are kept hot by steam and warm the air which is then discharged into the ward through floor registers.

The ward is divided into boys' and girls' sections by a glass-enclosed corridor. Swinging doors in the middle of this corridor permit easy transit from one section of the ward to the other. On one side is the office, where charts, x-rays and clinic records are kept. Opposite the office, completing the corridor, are four cubicles in which are kept newly admitted patients (cases of severe active carditis, marked chorea, and an occasional upper respiratory infection, may be put there). At the back of the office is a hall with cupboards and coat racks. At each end is a bathroom with a small elevated tub and mounting ladder and a child's toilet. Opening into the hall is the kitchen, with an electric refrigerator and combination sterilizer and steam table. Next is the utility room with a sterilizer. Completing the floor plan is the examining room with medicine cupboard, instrument sterilizer, and electrocardiograph. From this room a stairway leads down to a clinical laboratory and an electrocardiographic dark room.

The ward is bright and attractive. The beds are painted a soft green, and the bed-side tables, chairs and walls are of a light cream colour. The children all wear brightly coloured jackets. In the boys' ward there is an aquarium, and the patients greatly enjoy watching the manœuvres of the fish. There is a radio in each section. The ward accommodates 30 beds, divided equally between boys and girls. The children's ages vary from 17 months to 14 years. On admission the child is weighed and measured and put to bed between flannelette blankets. The rectal temperature, pulse and respiration are recorded, and a bed bath is given. Children with elevated temperature are given a soft diet with extra fluids, and those with normal temperature have the ordinary house diet with added nourishment, such as fruit juices in mid-morning, afternoon and at bed time. As a routine measure all children receive two drams of cod liver oil in an ounce of tomato juice twice a day, as well as two drams of Mistura Ferro-Catalytic (Frosst) after dinner and supper.

For acute joint pains various forms of external heat are employed, such as a hot water bottle or baker, or the affected joint may be painted with oil of wintergreen and covered with a flannel bandage. The patients receive three drams of a mixture containing salicylic acid four times a day at four hour intervals, which gives them 60 grains a day. The children with chorea receive 10 grains of aspirin and 15 grains of calcium gluconate four times a day at four hour intervals (Pearson[1]). Within the first few days each patient has various tests performed, *i.e.*, urinalysis, throat culture, Wassermann, sedimentation rate, blood count, Mantoux, Schick and Dick tests, x-ray of the heart, and an electrocardiogram. The calcium, phosphorus and total protein content in spinal fluid are determined on all patients with chorea.

As the children are usually in the ward for at least three months there are some special nursing problems. They must be taught to be passive, must be kept happy, warm and well fed, and must have physical, mental and emotional rest. The rest period before meals and the rest period from twelve noon to three in the afternoon must be enforced. The nurse in charge and her staff must watch for and report epistaxis, skin rashes, joint and abdominal pains, the appearance of nodules, signs of chorea, pallor, sweating and malnutrition. The night nurse must carefully record the sleeping pulse at midnight and at 4 a.m. As a general rule, after the sedimentation rate has remained normal for four to six weeks standard graded exercises are undertaken by the department of physiotherapy. Bathroom privileges and allowing the child to sit up for meals are permitted only upon request of this department. It has been noticed that after the acute infection has begun to subside emotional outbursts become less frequent and at the same time the physician has usually recorded improvement in the condition of the heart. Patients requiring special examination and care by dentists, otolaryngologists, etc., receive them when needed.

We have found this pavilion to be a boon in the treatment of rheumatism. As with tuberculosis, rest, fresh air, sunlight, and nourishing food with vitamins are, so far as our present knowledge goes, the only treatment for this disease. We also feel that, as in tuberculosis, the increase in weight and the improvement in the red blood cell count and hæmoglobin is of good prognostic import.

The personnel of the pavilion consists of four physicians on service, an intern, students acting as clinical clerks, three student day nurses, one night nurse, and a technician. There is also a physiotherapist and her staff, an occupational therapist, a recreational therapist and a school teacher. The latter four members of the staff do not begin to function until the patients are clinically ready for them, and not until the sedimentation rate, which is done every second week, has been normal for four to six weeks.

Work done by the authors[2, 3, 4] in the past years has led them to believe that the sedimentation rate is the best criterion for determining the activity of rheumatic infection in childhood. We have found that:

1. Acute rheumatic fever is a manifestation in which the sedimentation rate falls rapidly from a high level to normal, following the subsidence of symptoms.

2. Chorea is a manifestation in which the sedimentation rate is constantly normal, even slightly below normal in the absence of complications. There the disappearance of the clinical manifestations and a gain in weight are signs of inactivity.

3. Carditis is a manifestation in which with recovery the sedimentation rate falls slowly during a period of months to a normal level.

From this we have concluded that the sedimentation rate is the most delicate test for the activity of the rheumatic process, since observation of the body weight, temperature, pulse and total white blood count show that these tend to return more rapidly to normal than does the sedimentation rate. We might call attention again to the observation that rheumatic nodules tend to appear during the subsidence of the disease, as shown by a falling sedimentation rate. We have found that a critical fall in the sedimentation rate may precede cardiac decompensation and the appearance of œdema, and is of serious prognostic import.

When the sedimentation rate results indicate that the time has arrived for gradual exercise, the doctor refers the patient to Miss E. Asplet,[5] Director of the Physiotherapy Department, for treatment. The patients are graded under the following functional classification for patients with heart disease.

Class 1.—Patients with organic heart disease, able to carry on physical activity without discomfort.

Class 2.—Patients with organic heart disease unable to carry on ordinary physical activity without discomfort.

Class 3.—Patients with organic heart disease, with symptoms of signs of heart failure when at rest, and unable to carry on any physical activity without discomfort.

Class 4.—Possible heart disease. Patients who show abnormal signs or symptoms referable to the heart, but in whom the diagnosis of heart disease is uncertain.

Class 5.—Potential heart disease. Patients without circulatory disease, whom it is advisable to follow because the presence or history of an etiological factor may cause disease. The

majority of the patients referred for physiotherapy are included in Classes 4 and 5, and, the children being to a certain extent actively engaged, each patient is not long confined to passive exercise.

In accordance with the late Dr. Hunt's teaching (at Guy's Hospital, London) regarding the patient's toleration of exercise, as stated by Noel M. Tidy, one observes carefully the effect of exercise on (1) respiration; (2) pulse, and (3) general appearance, in order to decide whether the patient is doing too much active work.

Respiration. — The chosen exercise is hard enough to increase slightly both the range and rate of breathing, but the patient must not be rendered breathless, as respiration should return to the normal rate during the second minute after exercise.

Pulse.—The test is usually made and found to be the principal one as to how much it is permissible to raise the pulse rate. In early cases, at the beginning of treatment, the pulse should not be raised more than six beats by any exercise. After ten day's treatment, the pulse should not be raised more than eight to fourteen beats. After three weeks' treatment, it should not be raised more than twelve to sixteen beats. After the patient gets up, it should not be raised more than sixteen to twenty beats. The pulse should have returned, or almost returned, to its resting rate (as taken before treatment) at the end of two minutes.

When the patient is up a pulse ratio is used to test the capacity to work. The hardest exercise in the given table is used, the patient's pulse being taken before beginning the exercise and immediately afterward, the pulse counted for two consecutive minutes. The latter pulse rate is then divided by the resting pulse rate, the result being the pulse ratio.

Pulse before exercise	80
Pulse after exercise (1 minute)	100
Pulse after exercise (2 minutes)	85

Rate $185 \div 80 = 2.3$

Children, unlike adults, are unaware of the necessity for rest, and, if at all possible, will perform active movements with their arms, and if in the proximity of other children, will be as active as they can be in bed. Therefore, an occupational therapist is employed. With her aid the patient's activities are better controlled and quicker and better results are obtained. The word "occupation" may, at first, sound unreasonable to those who believe that absolute rest is esential in the treatment of rheumatic infections. Indeed, rest is extremely important, yet it could not be expected that a ward of thirty mentally normal children, ranging in age from one year and a half to fourteen, would lie, day in and day out, in a recumbent position. Therefore, it was deemed advisable by the physicians in charge to substitute the activities which were obviously inhibiting their recovery with other activities which would actually hasten a cure. An attempt is made to keep the children emotionally and physically passive (picture cards help in promoting the desired contentment in conditions of active carditis). If the patient cannot be persuaded to lie quietly, the next best position is accepted, that of sitting supported by a specially constructed back rest. Wedge-shaped pillows with attached arm rests induce a correct posture, allowing better chest expansion. Placed across the arm of the back rest are boards which hold the work or game at a convenient level. Rest periods are arranged in accord with the patient's requirements. The entire ward has a twenty-minute period of complete quiet during the two-hour period of occupational therapy. Each case is considered individually. The sedimentation rate is closely watched and any change in the patient's condition immediately noted. Muscular activity is reduced to a minimum by providing games or simple crafts which require concentration in a small area. Tiny coloured wooden blocks, placed in mosaic style to make a design or picture, stimulate and maintain interest, keep the little patient mentally happy and physically inactive except for a slight movement of the wrist and fingers of one hand. Occupation consisting of rhythmic and repeated actions are found of value in the attempt to lessen the choreiform movements. From observation made on this ward during the past year, we feel justified in stating that these random movements can be kept considerably under control when the mind is diverted. Knitting, sewing, lino-cutting, leatherwork, ship models, and novelty making are among the occupations taught the older children before they are discharged from the ward. An interest, and perhaps even a source of future financial independence, is provided for these more or less permanently handicapped

children in their inevitable struggle for existence among physically normal people. The activity during the entire hospitalization is graded and correlated with the physiotherapy given to build up resistance so that a relapse will be prevented.

The education of these children is not neglected and is in the hands of a capable teacher. The teaching is carried on as a branch of the School for Crippled Children, which institution supplies the teacher. The object of the work is to establish a preparatory grounding, particularly in reading and arithmetic, to minimize as far as possible the adjustment necessary when the patient is discharged and takes his place in the regular school. Children remaining in the hospital over long periods with illness such as tuberculous bone disease are encouraged and taught to work by themselves. With these patients the full school curriculum is followed, and on being discharged they attend the School for Crippled Children. With cardiac patients it is not possible to attempt the full program; the patient's strength is not equal to it. The greatest care has to be exercised not to press such patients or allow them to feel discouraged: the work must have a positive interest and be of therapeutic value. Geography and history become stories supplemented with drawings and maps modelled in plasticine. The aim here is to develop an interest in varied reading. Books from a good juvenile library are distributed among the patients. Learning to read is made as attractive as possible with colourful charts, vocabulary builders, and other means of converting learning into games. This preparatory work is particularly helpful for the non-English-speaking child. He has an opportunity to get a grasp of the language and is therefore not hopelessly lost when admitted to the public schools.

The recreational therapy department helps to maintain the well-being of these patients by controlled exercises, in the various forms of "play". Because it is the universal language of children, and as it is an activity which in its various forms involves the response of the organism as a whole, "play" has been found to be a useful therapeutic tool in dealing with problems arising in and from a hospital environment. How the tool is to be used, and to what end, are dependent entirely upon the specific situation at hand. The nursing staff and the recreation department use play as a fundamental approach in dealing with (1) fear and nostalgia in newly admitted and preoperative patients, with (2) behaviour problems which are apt to arise because of the feeling of isolation and confinement, in patients requiring prolonged periods of medical treatment, and (3) as a manner of creating with all patients confidence in, and consequently cooperation with, the medical staff. As rest is considered to be an important part of the medical treatment in cases of rheumatic fever, chorea, and carditis the problem which presents itself is to find the method or medium through which to gain both the conscious and unconscious cooperation of each individual child. Unfortunately, verbalization or talking is of little value in gaining true cooperation, as the memory span of children is relatively short in comparison with that of adults. Accepting this fact, an attempt is made, by presenting a large range of activity within physical and medical limitations, such as stories, story acting, songs, intellectual sense, and paper and pencil games, as well as folk games and highly socialized dramatic activity (such as playing "house", "store", or "hospital"), to build up a group control or behaviour pattern during the play, which will carry over into unsupervised times of the day and into the post-hospital lives of these children.

Having received the necessary care in the hospital, the patient is discharged from four to six week after all signs of clinical activity have ceased and the sedimentation rate has remained continually normal over this period. The following instructions are given the patient's parents on leaving the Rheumatic Pavilion.

1. Your child has been up one hour in the morning and one hour in the afternoon. Increase half an hour daily until up all day.
2. Insist on a rest in bed of 2 hours every afternoon.
3. Bed at night never later than 8 o'clock.
4. Guard against over fatigue at all times.
5. Keep in bed during periods of colds, fever or other illness, even if slight.
6. Dress warmly at all times: woollen underwear in the fall and winter.
7. Avoid damp feet.
8. Keep the child in the house during bad weather.
9. Give cod liver oil every winter.
10. Report to cardiac clinic, Wednesday afternoons at 1.30 for one month after discharge, and then every three months.
11. Report to clinic if child develops new symptoms or a return of old symptoms.
12. Report at once in case of joint pains or swelling of joints or feet.

The patients report periodically to the cardiac clinic for a check-up. This includes a complete physical examination, sedimentation rate determination, and, if possible, an electrocardiograph and x-ray of the heart. Patients failing to report as advised are investigated by the Social Service Department, and arrangements are made to have them seen regularly. Certain cases which are not suitable for hospitalization, yet are chronic sufferers and require convalescent care, are sent to the Chateauguay Convalescent Home just outside the Montreal area. This institution cares for other conditions of a chronic nature than rheumatism in children, and is controlled and supervised by a trained medical nursing staff.

CONCLUSIONS

The organization, both medical and physical of the "rheumatism" service in the Children's Memorial Hospital, Montreal, is described. The benefit both to the staff and to the patients of continuous observations by one group who are interested in a study of this disease is obvious. Of these benefits, one of the most marked is the freedom from repeated respiratory tract infections enjoyed by a moderately isolated group in a humidified atmosphere.

From our observations we would conclude that the next advance in the study of rheumatic disease in childhood must come from the study of the bacteriology of this affection.

As the establishment of a "Rheumatism Service" has resulted directly from the interest in this disease of Dr. H. B. Cushing, physician-in-chief, the authors gladly acknowledge their indebtedness to him for help, both clinical and material.

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ADRENAL HÆMORRHAGE (WATERHOUSE-FRIDERICHSEN SYNDROME) IN A YOUNG CHILD*

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THE main reason for the publication of this case is to show that a diagnosis of adrenal hæmorrhage can be made, based upon a definite clinical syndrome. There are numerous case reports in the literature, but with few exceptions the diagnosis has been based upon post-mortem findings.

Adrenal hæmorrhage can occur in varying degree in such conditions as diphtheria, scarlet fever, measles and pneumonia. It also has been known to occur in new-born and still-born infants, where it is chiefly of mechanical or traumatic origin. Snelling and Erb[1] found 43 cases of adrenal hæmorrhage in 3,637 consecutive autopsies, an incidence of 1.19 per cent. Of these 15 occurred in the new-born. In older children adrenal hæmorrhage is usually of toxic or infectious etiology.

The association of fulminating purpura with bilateral adrenal hæmorrhage has long been recognized. The numerous case reports in the literature indicate that this is not a rare condition. The earliest case reports are to be found in the English literature, Voelcker being the first to describe the condition in 1894. He described a peculiar symptom complex in a child two years old, admitted to the Middlesex Hospital in London. On admission the child had been ill for 24 hours. The clinical picture included vomiting, marked prostration, high fever and widespread petechiæ all over the body. The child died 48 hours after onset and was considered a doubtful case of variola. Autopsy showed hæmorrhage in both suprarenals. This report was followed by those of Garrod and Drysdale, Batten, Andrews, Talbot and others. It remained for Graham Little, in 1901, to classify such cases as a distinct clinical entity. Waterhouse,[2] in 1911, reported one case

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and collected 15 from the literature. He attempted to portray a definite disease picture, but added no knowledge as to the etiology, beyond observations concerning a possible bacterial cause. Friderichsen,[3] in 1918, in an inclusive review, brought the literature up to date and gave a detailed description of this interesting and characteristic clinical condition, which is now frequently called the "Waterhouse-Friderichsen Syndrome". McLagan and Cooke, in 1916, were perhaps the first to incriminate the meningococcus in two case reports, which fit definitely into the picture. Since that time there have been several other reports, chiefly in the German literature, notably those by Baumann, 1931; Glanzmann, 1933; and Bamatter, 1934. In 1923 the first cases were reported from America by Rabinowitz.[4] In the past five years there have been interesting reports by Goldzieher and Gordon,[5] Magnusson,[6] Snelling and Erb,[1] Aegerter, and Sacks.[7] The latter, in a very recent article, reports two cases of fulminating septicæmia associated with this syndrome, and brings the literature up to date in an excellent review.

CASE REPORT

A white female child, aged 21 months, was admitted in coma to the pædiatric service of the Montreal General Hospital on February 10, 1937. The past and family histories were completely negative. She had been breast-fed until the age of one year and had always been perfectly well. On the night of February 9th, she had gone to bed feeling well, except for a slight coryza. She slept well until 11 p.m., when she was awakened with abdominal pains. She vomited a greenish fluid during the night and was given castor oil. Her bowels moved on the morning of the 10th with a slight spotting of blood. It was noted during the night that when the left leg was moved she stiffened the muscles as if in pain. Hæmorrhagic spots appeared over her body at about 10 a.m., and she had her first convulsion at 1 p.m., which lasted for only a few minutes. She was admitted about 4 p.m. and died about 1 hour later.

When seen in the hospital the child appeared very well nourished and well developed, but was comatose and extremely toxic; temperature, 107° F.; pulse, 195; respirations 60. The colour was ashen-grey, and the mucous membranes and nail beds were deeply cyanosed. The whole surface, skin and mucous membranes, was covered with purpuric spots, small and large, the largest being 0.5 cm. in diameter. The upper respiratory tract was clear. Examination of the chest revealed moist râles over the left base. Aside from the tachycardia and feebleness of the pulse, the cardiovascular system was negative. The abdomen was slightly distended and the edge of the liver palpable. The reflexes were present, the knee jerks being hyperactive. No cervical rigidity or other signs of meningeal irritation were present. The blood picture on admission showed 8,000,000 red blood cells. The child had about 10 convulsions before death. There was incontinence of urine and fæces. She was given oxygen constantly, and blood was taken for grouping, but she died before a transfusion could be given. A diagnosis of hæmorrhage into the adrenals was made by me prior to the autopsy.

At autopsy the skin showed extensive small areas of subcutaneous hæmorrhage. Similar lesions were seen in the mouth. The only other positive findings were in the adrenals. Each weighed 5 g. The pathological findings in the two organs were exactly similar. Their external surfaces were smooth. They felt tense and were very dark red, due to a large acute diffuse intracapsular hæmorrhage. Serial sections were made of each adrenal, when the following was seen. Throughout

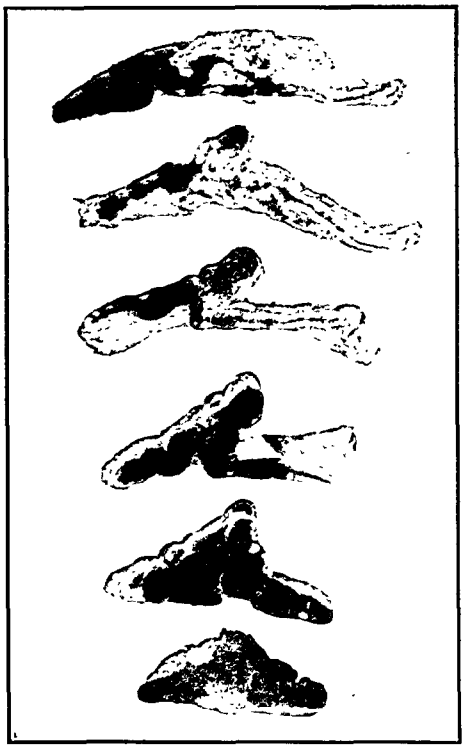


Fig. 1.—Serial sections through the right adrenal gland showing extensive hæmorrhage into the substance of the gland.

about one-half of each adrenal no normal adrenal tissues could be seen, their places having been taken by a massive acute hæmorrhage. Throughout the remaining half of the organs all the cortical and medullary tissues had not been completely replaced by blood. As the pole of the half of the organs that showed the least involvement was approached more and more medullary and cortical tissue could be recognized, until at the pole itself but little hæmorrhage was to be seen.

The thymus weighed 5 g. It showed no pathological lesion. Nowhere in the cerebral nerves were hæmorrhages found. The vessels of the pia-arachnoid and of the brain substances were moderately injected.

SYMPTOMATOLOGY

The history and symptoms in this case are so frequently repeated in the reports of other cases that one is compelled to recognize the Waterhouse-Friderichsen syndrome as a clinical entity. The majority of cases occur in young children. In the reported cases the ages varied from two months to nine years, with only approximately 10 per cent occurring in adults. About 70 per cent occurred in infants two years or younger. Goldzieher and Gordon[5] were able to collect 37 cases of adrenal hæmorrhage in the new-born and 38 in older infants,

and reported 6 additional cases in the newborn, 5 of which were diagnosed during life. Sex plays no part. The typical history states that the patient is in perfect health until the onset of the disease. The initial symptoms are such as may occur in any acute infection, but are more likely to be referred to the gastro-intestinal tract. Abdominal pain and vomiting are fairly frequent early symptoms. Many of the histories state that the child, having gone to bed quite well, wakens during the night with a cry. Hyperpyrexia is present, reaching levels as high as 108° F. at times. It is usually septic in type. Central nervous symptoms appear early, and vary from severe headache in adults, to delirium, restlessness and generalized convulsions in children. The patients soon lapse into a stuporous or semicomatose state and remain so until the end. Marked cyanosis is usually noted early in about half the cases. Magnusson[6] lays stress upon the varying character of the cyanosis. The lips and nails are blue and the skin livid. The cyanosis is quite out of proportion to any degree of pulmonary involvement, but, together with the marked increase in respiration and pulse rate, it has often led to a mistaken diagnosis of pneumonia. Soon after the appearance of cyanosis, petechiæ may be noted scattered over the trunk, face and extremities. The onset is sudden and they increase in size rapidly, becoming confluent, so that the skin takes on a blotchy appearance. Over the contact areas, the entire surface is involved, so that it assumes the appearance of post-mortem lividity. The rash remains until death, usually from six to ten hours later. At this time examination reveals an extremely toxic, often comatose, child, breathing shallowly and rapidly. Physical examination of the chest may reveal moist râles over the bases. There are no characteristic neurological findings. Cervical rigidity is usually absent. The usual course lasts from 24 to 48 hours, although the majority of cases terminate within 24 hours. Other less frequent findings are a disparity between the high oral and rectal temperatures and the low surface temperature, tremors of the extremities, and muscle flaccidity.

The laboratory is of little help in diagnosis, aside from the possibility of finding meningococci in blood smears from purpuric areas as suggested by McLean and Caffey.[8] Because of the fulminating character of the disease there are few detailed reports of the blood picture. There is usually a leukocytosis with a shift to the left. Three reports mention platelet counts, two of which were within normal limits and the third definitely lowered. Coagulation and bleeding time have been found to be within normal limits by several authors. Hypoglycæmia seems to be frequently present in these cases, at least during the time immediately before death. Elevation of the non-protein nitrogen of the blood has also been described.

PATHOLOGY

The most constant pathological finding is a massive bilateral adrenal hæmorrhage. This was present in about 95 per cent of the reported cases. Occasionally, only one adrenal is involved and, when so, it is usually the right. The hæmorrhage may vary from multiple pin-point areas, to a massive type, converting the adrenal into a blood cyst. It is nearly always confined within the limits of the capsule of the gland. In only one of the reported cases was rupture noted, with a resultant hæmorrhagic peritonitis. Microscopically, the densest hæmorrhage appears to be in the region of the medulla and zona reticularis of the cortex. It apparently involves the other layers by diffusion. Thrombosis or embolism is rarely seen, and an inflammatory reaction is usually absent. The skin lesions are usually due to direct involvement of capillaries and arterioles by the causative organism. Examination of the brain reveals only a congestion of the superficial vessels of the leptomeninges. An enlarged thymus is found frequently, with prominence of the mesenteric lymph nodes, hyperplasia of Peyer's patches and solitary lymphoid follicles of the intestines. This thymo-lymphatic prominence has been pointed out by Rabinowitz[4] and Bamatter. The latter believes it to be a factor of some importance in view of recent work showing a definite correlation between *status thymolymphaticus* and adrenal hypoplasia.

ETIOLOGY

The chain of signs and symptoms that characterize the Waterhouse-Friderichsen syndrome is most probably caused by a bacterial invasion of the blood stream. This view has resulted in bacteriological examinations being carried out in a number of cases. McLagan and Cooke in 1916, were the first to definitely incriminate the meningococcus. Herrick[9] has emphasized the

fact that it is in the fulminating type of meningococcal infection that a striking purpura is most apt to be found. It is, moreover, in this type of case that adrenal hæmorrhage is seen, rather than in the usual manifestations of meningococcus infection. The splendid work of McLagan and Cooke, McLean and Caffey,[8] Bamatter, and several others leaves little doubt that the disease is most frequently caused by the meningococcus, although other organisms may occasionally be the cause. It would be of interest to make blood-sugar determinations and adrenalin blood-sugar graphs in cases of menigococcal sepsis with dermal symptoms.

PROGNOSIS AND TREATMENT

The disease has up to now been almost universally fatal. The duration is rarely longer than 24 hours. In the few cases where it lasted more than 48 hours hæmorrhage into only one adrenal was found. Treatment is largely based on theoretical grounds. Intravenous injection of sodium chloride solution has been suggested, as there is a rapid loss of sodium ion from the blood stream, followed by fluid depletion. The administration of large doses of potent adrenal cortex extract along with epinephrine to increase its efficacy would seem to be indicated. Since so many of these cases are associated with a meningococcic septicæmia the intravenous use of antimeningococcic serum should be tried. Supportive treatment should be carried out with blood transfusions and intravenous dextrose, as there is usually an associated hypoglycæmia. In spite of the general opinion voiced in the literature that adrenal hæmorrhage is not amenable to treatment, vigorous treatment along the above lines may save some of these patients in the future. There is no doubt that many subjects have recovered spontaneously, as indicated by signs of previous hæmorrhage in patients who came to autopsy for other reasons at a subsequent time.

SUMMARY

A case of bilateral hæmorrhage into the adrenals (Waterhouse-Friderichsen syndrome) in a two-year-old child is described, in which a diagnosis was made before autopsy. No etiological agent could be found. A review of the literature reveals agreement in the clinical picture, consisting essentially of a fulminating septicæmia, associated with a striking purpura and intense cyanosis, with death in from 16 to 24 hours. Massive, bilateral adrenal hæmorrhage is the most common post-mortem observation. The etiology in the majority of cases is probably a fulminating meningococcæmia. The suggested treatment includes adrenal cortex extract, epinephrine, sodium chloride, fluids, antimeningococcus serum, dextrose and transfusions.

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EFFECT OF DIURESIS BY MERCURIALS ON CLINICAL COURSE OF CONGESTIVE HEART FAILURE.—L. E. Hines states that a study of a series of hypertensive and arteriosclerotic patients with heart disease and congestive failure suggests a decrease in the duration of life after the use of mercurial diuretics. A high incidence of uræmia was observed in the group. The known effects on the blood produced by mercurial diuretics show some points of similarity to the changes in the blood observed in uræmia. Harmful effects from mercurial diuretics probably result from rapid removal of large quantities of œdema fluid rather than from mercurial damage to the kidneys. Mercurial diuretics should be used conservatively. As a consequence of this study each patient with congestive failure is subjected to a more critical study before salyrgan is used. To prevent possible harm the following plan is instituted. (1) Salyrgan is used only when rest, digitalis and xanthine diuretics fail to produce the desired diuretic response. (2) The preliminary examination includes estimates of the plasma chloride content, the urea nitrogen content, the carbon dioxide combining capacity and the blood phenol content; the drug is not given if markedly abnormal values are observed. (3) During the period of diuresis determinations are made, frequently if symptoms suggest the onset of uræmia. (4) Marked lowering of the plasma chloride content, if associated with mental symptoms, points to a need for the intravenous administration of saline solution. (5) Lowering of the carbon dioxide combining capacity with symptoms of acidosis requires restriction of ammonium chloride and administration of sodium bicarbonate and dextrose. (6) The first dose of salyrgan should be given intramuscularly to eliminate the danger of the rare hypersensitive reaction. (7) Secretions of large amounts (from 5 to 10 litres daily) is more dangerous than secretion of smaller amounts; doses of from 0.25 to 0.5 c.c. in some cases produce an adequate response.—*J. Am. M. Ass.*, 1938, **110:** 202.

ACUTE CHOLECYSTITIS*

BY JAMES MCKENTY, M.D., F.A.C.S., F.R.C.S.(C.)

Winnipeg

DURING the last decade of the nineteenth century the profession debated whether early operation or interval operation, that is, operation after the subsidence of the attack, yielded the better results in acute appendicitis. In 1895 Sahli,[1] then Chief of the Medical Clinic at Berne, Switzerland, reported from a study of 6,740 cases that medical treatment of the first attack had a mortality of 8.8 per cent and of subsequent attacks a little higher. Prior to Sahli's report the mortality of non-surgical treatment of appendicitis was not definitely known. Before the end of the century many surgeons reported mortalities of less than 3 per cent from early operation. Thus was the problem of acute appendicitis finally settled in favour of early operation.

A quite similar problem now exists regarding the treatment of acute cholecystitis, that is, whether early operation or operation in the interval after the subsidence of clinical symptoms is the better plan. All surgeons agree that operation is necessary for complete cure, but hold diverse views on when the operation should be undertaken. The mortality of the medical treatment of an attack is unknown, and the proportion of those recovering who have subsequent attacks is also unknown. In the absence of knowledge on such important points a conclusion as to the best method of treatment cannot be formed with certainty. In the recent literature I find 358 cases reported to have received medical treatment only, and 77 more were found in the records of the hospitals of Winnipeg, making in all 415 treated medically, with 23 deaths (5.2 per cent), and without improvement in 94, making 117, or 26.7 per cent, in whom medical treatment failed. Four hundred and fifteen is too small a number on which to base a conclusion as to the efficiency of medical treatment of an attack but it is at least suggestive. During ten years of general practice from 1890 to 1900 I lost 3 cases under medical treatment. My impression, guess or surmise, is that the mortality of medical treatment is at least 5 per cent, and that it fails to give relief in about 25 per cent. But the impressions of even an old practitioner, if not based on carefully studied data, have no scientific value. If general practitioners would keep records of the number of cases coming under their care and the results of treatment, much data of value in the solution of the problem of acute cholecystitis might be accumulated.

THE DIAGNOSIS

Every attack of acute cholecystitis begins as biliary colic. Only when it occurs as a complication of typhoid fever, that is, when hæmatogenous in origin, may the colic be absent. Biliary colic that continues for more than 12 or 18 hours should be considered to have an inflammatory basis, especially if muscular rigidity in the right upper quadrant persists between the spasms of colic. If a tender mass can also be felt in the gall-bladder region the diagnosis of acute cholecystitis may be regarded as positive. Systemic symptoms are more likely to be absent during the first 24 hours. Vomiting occurs in about 75 per cent. Inflammation of a high-lying appendix may be difficult to exclude. The colic of the onset of appendicitis is, however, much less intense than that of biliary colic. The practitioner should also remember that coronary thrombosis may simulate colic in the upper abdomen. Diagnosis is in 90 per cent of cases easily made, as it should be, within 48 hours of the onset of colic.

SURGICAL MORTALITY

Surgery is called upon when the condition of the patient under medical treatment becomes worse, as was the custom with acute appendicitis 45 years ago. Table I, giving reports covering 3,507 cases operated upon with a mortality of 10 per cent, includes those admitted to hospital in a moribund condition. In the 26 essays covered by Table I the duration of symptoms prior to operation is rarely stated, so it is fair to assume that the vast majority were operated upon after the subsidence of systemic

* Read at the meeting of the Winnipeg Medical Society, October 15, 1937.

symptoms, which is still the practice of the majority of surgeons. A mortality of 10 per cent is much too high to render this practice justifiable. That operation during the first three days of the attack, before the stage of complications has set in, might yield better results, is indicated by Table II, which shows a mortality of less than 2 per cent in 258 cases.

A study of 14 reports by Heuer[2] finds that operation during the stage of complications, that is, during the second and third weeks, has as an average mortality of 46 per cent. During this stage a drainage operation may be necessary in order to save life, as in the following case.

TABLE I.

OPERATIVE MORTALITY IN ACUTE CHOLECYSTITIS

		Cases	*Deaths*
Rowland	*The Lancet*, 1932, **1**: 975	116	20
Pratt	*Am. J. Surg.*, 1933, **22**: 46	45	10
Mentzer	*Surg., Gyn. & Obst.*, 1933, **55**: 709	71	16
Zinninger	*Ann. Surg.*, 1932, **96**: 406	89	7
Love	*The Lancet*, 1929, **1**: 375	90	15
Smith	*Ann. Surg.*, 1931, **98**: 766	107	10
Graham	*Ann. Surg.*, 1931, **93**: 1152	198	11
Kment	*Bruns' Beitr. z. klin. Chir.*, 1930, **150**: 534	117	17
Fowler	*Am. J. Surg.*, 1933, **22**: 53	545	56
Miller	*Ann. Surg.*, 1930, **92**: 644	200	27
Judd and Phillips	*Ann. Surg.*, 1933, **98**: 771	508	24
Heuer	*W. Virginia Med. J.*, 1930, **26**: 257	56	3
Eliason and Erb	*Ann. Surg.*, 1935, **101**: 460	158	10
Bass and Bird	*Am. J. Surg.*, 1936, **32**: 241	10	5
Wolfson and Rothenburg	*J. Am. M. Ass.*, 1936, **106**: 1978	31	3
Steinke	*Am. J. Surg.*, 1935, **27**: 135	200	23
Hayes	*Minn. Med.*, 1934, **17**: 319	14	0
Heuer	*N.Y. State J. Med.*, 1936, **36**: 1643	124	2
Lipshutz	*Ann. Surg.*, 1935, **101**: 902	20	0
Mentzer	*Surg., Gyn. & Obst.*, 1936, **62**: 879	51	8
Taylor	*Surg., Gyn. & Obst.*, 1936, **63**: 298	112	17
Glenn	*Ann. Surg.*, 1936, **103**: 77	80	4
Branch and Zollinger	*New Eng. J. Med.*, 1936, **214**: 1173	229	24
Boyce and McFettridge	*Surg., Gyn. & Obst.*, 1936, **53**: 43	35	10
Heyd	*Ann. Surg.*, 1937, **105**: 1	34	5
Graham, R. R.	*Canad. M. Ass. J.*, 1935, **32**: 283	120	8
Local Hospitals		71	12
Author		76	5
		3,507	352
		(10% Mortality)	

Mrs. S. was admitted to hospital eight hours after the onset of colic. In deference to the view then generally held that operation during colic is inadvisable, she was treated medically. Systemic symptoms steadily became more intense, the temperature on the fourth day reaching 104° and the pulse 140. A cholecystostomy then was done under local anæsthesia, and in five days she was free from symptoms. She refused further operation and went home on the twentieth day after operation with a biliary fistula which discharged intermittently for more than two years, then closed, and she returned with another attack of acute cholecystitis. This time a partial resection of the gall sac was done, followed by a very stormy convalescence, complicated by subphrenic abscess and empyema of the right pleura, requiring in all a stay of 3½ months in hospital. My refusal to do a cholecystectomy during colic on her first admission was a serious blunder involving prolonged and dangerous morbidity. Done at that time the mortality of cholecystectomy is not greater than in the chronic case.

TABLE II.

THE MORTALITY OF OPERATION DURING THE FIRST THREE DAYS

		Cases	*Deaths*
Hayes	*Minn. Med.*, 1934, **17**: 319	10	0
Heuer	*N.Y. State J. Med.*, 1936, **36**: 1643	124	2
Lipshutz	*Ann. Surg.*, 1935, **101**: 902	6	0
Taylor	*Surg., Gyn. & Obst.*, 1936, **63**: 298	19	1
Graham	*Ann. Surg.*, 1931, **93**: 1152	20	1
Zinninger	*Ann. Surg.*, 1932, **96**: 406	12	0
Pratt	*Amer. J. Surg.*, 1933, **22**: 46	23	0
Stone and Owings	*Ann. Surg.*, 1933, **98**: 760	3	0
Meranze *et al.*	*Archiv. Surg.*, 1937, **35**: 87	16	0
Author		25	1
		258	5
		(1.9% Mortality)	

My review of the literature leads me to agree with Heuer; (1) that acute cholecystitis should be considered in reports apart from instead of being included with other forms of biliary tract disease; (2) that the day on which operation is performed should be counted from the onset of colic and not from the admission of patient to hospital, and that the term "early" should be avoided as being too indefinite.

THE PATHOLOGY

The study of the pathological condition disclosed by operations upon the living has done so much to clarify our understanding of intra-abdominal disease that the operative findings in my 76 cases of acute cholecystitis may be worth presenting. A classification into the uncomplicated and the complicated I have found the most satisfactory.

1. *The uncomplicated.*—In 35 operation was done during this stage, finding in 34 a large stone in Hartmann's pouch or a smaller one impacted in the mouth of the cystic duct and completely obstructing the duct. The gall sac is always greatly distended, its walls œdema-

tous, from 0.5 to 1 cm. in thickness; the contents slightly bile stained muco-purulent liquid with stones in 34 of the 35 cases. The peritoneal coat usually retains its lustre but may present patches of inflammatory lymph, less often recent frail omental adhesions. The colour of the sac is usually a deep purplish pink. The mucosa shows necrotic patches in a few cases, is always soft and easily detached from the underlying fibro-muscular coat. I have found this type of lesion in those cases operated upon within five days of the onset of colic, rarely after the first week. The view that the marked thickening of the gall bladder is due to obstruction of lymph and venous channels by the stone impacted in the lower end of the gall sac is growing in favour; and the fact that in this stage the bacterial count is often negative and always low supports the view that it is not primarily an inflammation of bacterial origin. Acute œdema is regarded as a more appropriate name for the condition than acute cholecystitis.

2. *The complicated stage.*—The following complications may occur in from 15 to 30 per cent of cases after the beginning of the second week. (*a*) Adhesions to omentum and adjacent viscera, usually dense and difficult to detach, and in a few cases leading to the formation of fistulæ between the gall sac and duodenum or colon. (*b*) Gangrene of the gall sac is the most frequent complication, usually in patches leading to rupture. (*c*) Perforation is the second most frequent complication. It has been found as early as the third day. (*d*) Abscess, pericholecystic, subphrenic and hepatic. (*e*) Peritonitis, diffuse, is the most frequent cause of death in acute cholecystitis. (*f*) Pylephlebitis, a rare complication, has been known to result from abscess contiguous to the portal vein or its tributaries. (*g*) Empyema of the gall bladder is present in the majority of cases operated upon during the third and fourth weeks. (*h*) Pneumonia is a more frequent complication in acute than in chronic cholecystitis. (*i*) Empyema of the right pleura.

The incidence of the above complications reported in the papers quoted in Table I is between 15 and 30 per cent. The longer operation is delayed, the higher the incidence of complications. The damage found in this stage of complications is beyond the reparative power of nature to remedy. Such conditions as gangrene, pericholecystic abscess, perforation and peritonitis, all require surgical intervention to effect cure.

Thirty-nine of my 76 cases were found to belong to this stage. In 7 pericholecystic abscesses were present, and in 5 rupture of the gall sac had occurred through a gangrenous area with extravasation of pus and stones into a pocket walled off by duodenum, liver, transverse mesocolon and omentum. In all the abscess was effectively circumscribed; consequently a spread of infection from such abscesses must be rare so long as bile does not enter the gall bladder. The obstruction to the cystic duct, however, ceases soon after the extrusion of the contents of the gall sac through the perforation, and the bile then carries infectious material from what was previously a well circumscribed abscess into the peritoneal cavity, setting up a peritonitis either local or diffuse. Colp and Ginzburg,[3] in an analysis of 130 autopsies on patients dying from biliary tract disease, found that peritonitis accounted for one-third of the fatalities from acute cholecystitis. In my 76 cases stones were found in 71, or 94.6 per cent.

PROGNOSIS

With the above operative findings in mind we are in a position to consider the result to be expected in those patients who recover from the attack under medical treatment. In those in which the symptoms subsided within one week the pathological process will most likely not have advanced beyond that found in the uncomplicated stage. We know that a gall bladder into which bile does not gain entrance soon becomes a septic sac, that is empyema. Those into which bile does gain entrance may undergo a degree of resolution resulting in a sac largely transformed into fibrous tissue without function and of no service to the system, and as it contains stones in more than 90 per cent of cases it is almost certain to give further trouble. In those in which subsidence of symptoms does not occur until after the stage of complication has been reached the best result that can be expected is empyema of the gall sac, with extensive adhesions crippling the functions of the stomach, and, by harbouring microorganisms, becoming a source of toxæmia. And when we remember that from 2 to 5 per cent of stone-

containing sacs acquire malignant change the necessity for removal becomes evident. It is evident from the above that medical treatment can never cure acute cholecystitis.

TREATMENT

1. Those cases not admitted to hospital within the first five days should be treated by the delayed plan, that is, operation should be postponed for at least two weeks after the subsidence of systemic symptoms. The liability to perforation and peritonitis makes it absolutely necessary that such patients remain under observation in hospital until deemed ready for cholecystectomy. Should signs of peritonitis develop operation must be done without delay. Such operation may have to be removal of the gall sac, but the less dangerous drainage operation should be done if it meets the indications of the operative findings. Any type of operation performed during the presence of systemic symptoms has the highest mortality.

2. When the patient is admitted to hospital within the first five days an immediate cholecystectomy should be done. If done within the first three days Table II shows that it has a mortality less than 2 per cent. This is the plan of treatment which I would urge upon the practitioner to adopt whenever possible. He should realize that prompt operation is just as important in the management of acute cholecystitis as it is in the management of acute appendicitis.

The view here presented is that of a rapidly increasing proportion of the surgeons of the English-speaking world. I also urge that a partial resection of the gall bladder, leaving the portion attached to the liver undisturbed, is, in the presence of sepsis, a safer procedure than complete cholecystectomy, which leaves a denuded, raw gall-bladder bed on the liver surface which is prone to absorb the toxins in the region. Thirty out of my 76 operations were partial resections with only one fatality.

CONCLUSIONS

1. Medical treatment has a mortality of about 5 per cent and fails to relieve in at least 25 per cent. Those who recover from an attack under medical treatment are never cured and are liable to repeated attacks.

2. The mortality of surgical treatment under the plan of waiting for the subsidence of systemic symptoms is 10 per cent.

3. The mortality of operations performed within three days of the onset of colic is less than 2 per cent, and the duration of hospitalization and morbidity is much shorter than under the delayed plan.

4. The most rational classification is into the uncomplicated and the complicated stages. The uncomplicated I found in those operated upon within 3 to 5 days of the onset of symptoms. The complicated are found in those cases operated upon after the first week. These complications are all highly dangerous and account for the high mortality under the delayed plan of treatment.

5. The absence of systemic symptoms or even a low leucocyte count cannot be relied upon to indicate underlying pathological manifestations of minor degree.

6. A reduction in mortality depends more upon the general practitioner than upon the surgeon. When the former is convinced of the need of prompt operation and of his responsibility for placing his patient where it can be performed, reduction in mortality can be expected.

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NON-TROPICAL SPRUE.—H. Stalder describes briefly the symptomatology of non-tropical sprue and reports two personal cases. He believes that non-tropical sprue is probably a secondary B_2 avitaminosis. The administration of vitamin B_2, which is a compound of flavine and phosphoric acid present in yeast, has brought about a cure in one of the cases after all other therapy had failed. The blood picture was improved at the same time. The necessary dose of vitamin B_2 varies according to the gravity of the case. The favourable effect of campolon on non-tropical sprue is probably due to the presence of small quantities of flavine-phosphoric acid in it. These small quantities may, however, be insufficient for certain grave cases of sprue. In such patients large doses of yeast may prove effective. The effect of the hormone of the adrenal cortex in sprue is uncertain, although the weakness, hypotension, anæmia, hypoglycæmia, and pigmentation certainly indicate an adrenal insufficiency.—*Schweiz. med. Wschr.*, November 13, 1937, p. 1091. Abs. in *Brit. M. J.*

CARBON DIOXIDE*

BY RALPH M. WATERS, M.D.

Madison, Wis.

CARBON dioxide as a therapeutic agent has come to be greatly overrated. As a final insult to previously deranged function it is not infrequently the cause of death. In the *British Medical Journal* for May 28, 1927, K. B. Pinson, of Manchester, England commented upon convulsions occurring during surgical anæsthesia as follows.

"I have come to regard the convulsion as largely an outcome of the extensive action of the carbon dioxide in patients who are sensitive to this naturally, or by reason of toxæmia, pyrexia, and so on, and who are under the influence of ether, a substance itself having a marked effect on breathing . . . . however it may be, treatment based on this assumption has so far been successful. It is directed to the riddance of excess carbon dioxide, and must be prompt. Luckily some moments' warning is given of the impending seizure by twitching of the eyelids and mouth, jerkiness of the breathing, especially inspiration, or some strange movement or sound, and so the essential thing can be accomplished—the immediate removal of all coverings from the face before the convulsions have set in. Frame, towels, everything, are taken right away, and the air of the room given free access; any obstruction must be completely relieved. . . . . In this way the carbon dioxide will diminish as much as possible by natural means. . . .

"A field for investigation is here; but the most important thing for the time being is that as many as possible should know how to recognize the condition and treat it."

On October 29, 1927, Pinson wrote in the same journal:

"My experience of this phenomenon makes me adhere to my original suggestion as to its cause; and the administration of carbon dioxide, I believe would make matters worse."

In the same journal for August 10, 1929, he says:

"When I repeat that it is an excess of carbon dioxide which affects it, I mean in conjunction with the other factors—etheration, toxæmia, pyrexia, idiosyncrasy, and, perhaps not least, an excess of oxygen."

Thus, ten years ago the answer was written to a question frequently discussed and never settled by present-day anæsthetists. The "field for investigation" is still here, but the keen observation of Pinson ten years ago, had we read it more carefully, should have saved us much discussion as to the usual stimulus of convulsions during anæsthesia.

The trigger effect of excess carbon dioxide in producing convulsions under certain exceptional circumstances is only one of its dangerous qualities. As we continue each year to meet patients with more severe biochemical and physiological imbalance, it becomes more necessary to guard carefully against the slightest derangement of normal physiological conditions which it is within our power to avoid. In the meantime we may hope for a more perfect explanation from the physiologist regarding the delicate mechanism by which our bodies maintain a proper balance in the transport and utilization of oxygen and elimination of carbon dioxide.

Clinical misapprehensions regarding the physiology of carbon dioxide seem to have had their inception in the work of Yandell Henderson in the early years of the present century. Henderson deduced from his experiments that—surgical shock results from low carbon dioxide in the blood and tissues; that low carbon dioxide in the blood and tissues is a usual accompaniment of anæsthesia; and that hyperventilation of the lungs by the use of carbon dioxide and oxygen mixtures should prevent post-operative pulmonary atelectasis. All three of these deductions are fallacious. I make this statement based upon my own personal experience in clinic and laboratory, verified amply by the experience and experiments of others.

The belief that shock is entirely dependent on low carbon dioxide is disproved by the fact that Seevers[1] has hyperventilated dogs for many hours, reducing the blood carbon dioxide to points below 15 volumes per cent, without extreme drops in blood pressure and with no evidences of shock. Carbon dioxide added to the inspired air of both men and animals whose blood pressures were low as a result of profound spinal anæsthesia has, in certain cases, resulted in a further drop of blood pressure, and has never resulted in a more sustained rise in blood pressure than could be produced by ventilating

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* From the Department of Anæsthesia, University of Wisconsin Medical School.

Read at the meeting of the Canadian Medical Association, Ottawa, Section of Anæsthesia, June 23, 1937.

the lungs with oxygen alone. Eastman and Kreiselman have recently made a cinematographic record showing that, in reestablishing respiration following oxygen crisis or a complete apnœa due to oxygen want, carbon dioxide added to the oxygen used in artificial respiration has, on certain occasions, caused a further drop in blood pressure and always a less satisfactory circulatory recovery than was secured by artificial respiration with oxygen alone.

Henderson's assumption that anæsthesia is accompanied by low carbon dioxide in alveoli, blood and tissues may have had a basis during the last century. Such is far from the case in anæsthesia of the present day. Pre-operative medication with such drugs as opium, barbiturates, tribromethanol, etc., results in a distinct decrease in minute-volume respiration, less efficient ventilation, and a piling up of carbon dioxide in alveoli, blood and tissues. Although it is true that many inhalation agents tend at first to stimulate respiration, their effect, as administered at the present time, seldom or never results in sufficient respiratory stimulation to overcome the high carbon dioxide present at the beginning of induction due to premedicant agents. In the accompanying Table I are displayed the results of gas analyses of alveolar air and blood during anæsthesia with two of the commoner inhalation agents.

TABLE I.

Ethylene+O_2 by CO_2 absorption technique	*Analysis Carbon Dioxide*		
	Trachea percentage	*Artery volume percentage*	*Vein volume percentage*
9:13—1′ 43″ After morph. ¼+scop. 1/100		49.5	51.2
9:15—9:32 Morph. ⅛+scop. 1/200 Morph. ⅛+scop. 1/200 Induction with C_2H_4 begun			
9:50	6.3	49.8	50.4
10:30	7.3	53.0	53.3
Cyclopropane+O_2 by pharyngeal insufflation			
7:50—1′ 20″ After morph. 1/6+scop. 1/150		48.3	53.3
8:21—20″ After cyclo. induction Accidental overdose and respiratory arrest			54.3
8:40 Technique corrected			50.3
8:42	5.4		
8:46		49.9	
8:57	5.3		49.1
9:19			51.7
9:23	4.5		

The percentage of carbon dioxide in gas samples taken from the trachea and the carbon dioxide content of artery and vein during an ethylene anæsthesia administered by the absorption technique. Note the tendency toward increasing carbon dioxide.

In the lower part of the Table are similar analyses taken during an anæsthesia administered by pharyngeal insufflation where there is an actual reduction in the normal dead space. Note that even in this circumstance, the tendency to a depression of carbon dioxide is very slight.

That hyperventilation with carbon dioxide and oxygen mixtures decreases the incidence of post-operative pulmonary atelectasis has not been borne out by clinical experience.[2,3] It is pertinent to note that isolated lobes of the lung with intact circulation can be shown to absorb gases at varying rates, resulting in varying degrees of atelectasis according to the receptivity of the blood for their transport. The accompanying Table taken from Lemmer and Rovenstine,[4] gives the comparative rates of absorption to "moderate collapse" following inflation of an isolated lobe and complete obstruction of its bronchus. The figures do not, however, indicate satisfactorily the fact that lobes filled with the rapidly absorbed gases, when watched for longer periods, become *completely* atelectatic and liver-like in appearance; whereas such lobes filled with nitrogen tend never to become liver-like in consistency. We may conclude, therefore, that the administration of carbon dioxide must be made with a complete appreciation of its physio-

TABLE II.

RATE OF ABSORPTION FROM ISOLATED LOBES WITH CIRCULATION INTACT

Gas used	*Number of experiments*	*Average time of absorption to given point*
Carbon dioxide	9	1 min. 6 sec.
Oxygen	12	1 " 20 "
Nitrous oxide	6	1 " 42 "
Ethylene	3	2 " 2 "
Air	12	9 " 21 "
Nitrogen	6	12 " 6 "

Table showing the rate of absorption to "spotty" atelectasis of isolated lobes of the lung with circulation intact. It is obvious that the absorption of nitrogen is much less rapid than is the absorption of oxygen.

logical characteristics. First of all, we must not lose sight of the fact that it is a waste product of body metabolism, just as are the constituents of urine. Reduction in the physiological efficiency of respiration tends to dam back carbon dioxide in the tissues just as physiological disturbances of the kidney tend to dam back the excretory products usually eliminated through that organ. Secondly, we must keep in mind that all drugs used for the relief of pain have at least the tendency to interfere with the normal function of pulmonary ventilation—the non-volatile agents through their tendency to depress respiration, and the volatile agents through the mechanical difficulties of administering them without obstruction of the respiration, and without the application of a mask over the nose and mouth, which always involves some dead space being added to the upper respiratory tract. Wilful increase of this space by means of rebreathing bags or short circuiting of the expired air around alkaline absorbers means, from a physiological standpoint, that the anæsthetist is administering carbon dioxide. When he does so with a full realization of the fact and a recognition of the signs of too much carbon dioxide no harm may result. The knowledge on the part of the anæsthetist that he is adding carbon dioxide by such modifications in technique is the important fact to be kept in mind.

When one contemplates the therapeutic addition of carbon dioxide to the inspired air as it is practised in many hospitals he is forced to question the legitimacy of such therapy. With extremely rare exceptions, artificial respiration without carbon dioxide would doubtless serve the patient much better. The anæsthetist will do well to bear in mind certain characteristics of this agent. First of all, do not forget the extreme variability of its effect in different individuals and in the same individual at different times. Diseases which cause changes in transport or changes in biochemistry, or changes in metabolic activity, greatly modify susceptibility. Next, it must be remembered that carbon dioxide in concentrations above 10 per cent is incompatible with consciousness in normal human beings. The physical signs of excess carbon dioxide described by Pinson in the quotation at the beginning of this paper can scarcely be elaborated unless one is unfamiliar with the common physiological effects—a rise in blood pressure and hyperpnœa which usually occur and which may be followed by a fall in blood pressure, respiratory depression and apnœa. Whenever hyperpnœa and high blood pressure do not accompany rebreathing or carbon dioxide administration, overdose is probably present.

In the light of our present knowledge, we at Wisconsin find the following attitude toward carbon dioxide therapy tenable on the ground of clinical results.

Shock.—Never do we apply carbon dioxide therapy or rebreathing with a view to the prevention or ameliorization of surgical shock. Simple oxygen therapy without carbon dioxide has been found more satisfactory.

During anæsthesia.—During inhalation anæsthesia, regardless of technique or drug, with the exceptions noted below, our effort is to avoid dead space and rebreathing as much as possible. Seldom or never do we find it to the patient's advantage to add carbon dioxide from a cylinder during administration. Exceptionally, we find ourselves embarrassed for ample time to accomplish induction with ether rapidly enough, to meet the demands of an overworked and harassed surgeon. On such occasions we do sometimes yield to the demand by removing the soda lime canister during induction. The use of carbon dioxide for hastening ether elimination will be discussed under hyperventilation. During anæsthesia our effort is directed toward avoiding dead space in the apparatus and toward maintaining an inspired atmosphere as near to the composition of atmospheric air as is compatible with the required depth of narcosis.

Post-anæsthetic hyperventilation.—Carbon dioxide is never administered for this purpose when mixed with oxygen nor by means of a mask and breathing bag. The induction of active hyperpnœa, which leaves in the more remote alveolar spaces a rapidly and completely absorbable medium such as oxygen, we believe does more harm than good. When we wish to accomplish rapid elimination of toxic volatile substances or gases or anæsthetic agents, a small stream of pure carbon dioxide is directed toward the face at a rate just capable of causing the desired hyperpnœa. The remote pulmonary areas likely to become inactive after hyperpnœa are thus left filled with their normal atmospheric content. The periodic administration of carbon

dioxide for lung exercise is used in a similar way, and only when cooperation of the patient cannot be secured in procuring voluntary deep breathing. If the patient is already receiving oxygen, this is interrupted during the period of hyperpnœa.

Finally, we prefer that the administration of carbon dioxide be made under the direct observation of a physician. Whenever it fails to produce hyperpnœa, or when unusual or unexpected results, such as muscle twitching, depressed and irregular breathing, or poor colour supervene, immediate abandonment of the treatment is indicated.

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RESULTS IN THE MEDICAL TREATMENT OF GASTRIC ULCER*

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THE results in the medical treatment of gastric ulcer over a period of years have not received the consideration which the subject merits. The present report represents our findings in a group of patients who have had a history of gastric ulcer for several years. The previous clinical history was obtained from the hospital records and the history of the present symptoms was noted. The periods in which the patient was symptom-free were recorded. A careful physical examination was done. An alcohol test meal was carried out in each case, and the results recorded in the fasting, half hour, and one hour periods. These results were compared with previous gastric analyses. A short gastric series, including a fluoroscopic examination, was done in all cases and the results were compared with the former x-ray findings. The type of medical treatment followed, whether duodenal tube or modified Sippy diet, and the diet and management of the patient after discharge from the hospital were recorded. Considerable difficulty was experienced in collecting a group of 40 cases of gastric ulcer who had been under observation during the past five years. The records showed that the history of the disability extended from four to forty years, the average time being thirteen and a half years. The average age was 55. The youngest was 39, and the oldest 79. In this group there were 20 males and 20 females; 28 were born overseas and 12 in Canada. Epigastric pain was a typical symptom in 32 cases. Pain in the majority of cases occurred from one-half to one hour after meals. Vomiting occurred in 25 cases. Hæmatemesis was present in 15 cases, and in 4 cases there was a history of two or more hæmorrhages. Flatulency was a marked symptom in 16 cases. Diarrhœa was present in 4 cases. Acute perforation occurred in only 1 case. Thirty-three patients had been symptom-free for approximately five years. Seven had symptoms of ulcer. The gastric analyses showed an absence of free HCl in 10 cases, a low free HCl, 20 per cent or less, in 10 additional cases. The highest free HCl was 78 per cent. The x-ray investigation of the stomach and duodenum showed evidence of gastric ulcer in 3 cases of this series, 2 of which also showed scarring of the duodenal cap. An organized hour-glass without ulcer was present in 4 cases. A healed duodenal ulcer, with no evidence of gastric ulcer, was noted in two cases.

This group of 40 patients was treated either with the duodenal tube or a modified Sippy diet for from three to five weeks. Twenty were treated with the duodenal tube, the majority of whom were relieved of their symptoms in from two to three days. After beginning treatment we found that patients could generally take with comfort six ounces of whole milk, with two ounces of 24 per cent cream, and a half to one ounce of milk sugar in each feeding. Six to seven feedings in twenty-four hours were given, roughly from 2,300 to 2,600 calories. The average gain in weight was three pounds; in a few

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cases the weight remained stationary, and in a few cases there was a loss of from one to five pounds. At the end of three weeks if there was still radiographic evidence of an active gastric ulcer a further course of three weeks with the duodenal tube was considered necessary. Regulation of the bowels was controlled by milk of magnesia or a simple enema. A modified Sippy diet was followed in 20 cases. Alkalies were used sparingly; in fact, when symptoms were controlled by the diet no alkalies were given.

On discharge from the hospital each patient was given a dietary, including a list of foods to avoid. General instructions as to rest, exercise, regulation of bowels, were included. When these patients returned to the clinic many of them said that they had not followed any special diet, but on careful enquiry we found they had avoided raw fruits, raw vegetables, fried foods, etc. In fact, they had followed a careful regimen. Again, there were other patients who had apparently disregarded diet and yet were symptom-free.

SUMMARY

A report of 40 cases of gastric ulcer. The average age was fifty-five. The usual duration of symptoms was thirteen and a half years.

The majority of cases have been under observation for five years or more.

Thirty-three out of 40 patients have been free of symptoms for approximately five years.

Seven patients had symptoms suggestive of gastric ulcer, but only 3 had x-ray evidence of an active gastric ulcer.

Twenty were treated with the duodenal tube, and 20 with a modified Sippy diet.

The study of these cases suggests that patients of fifty years or over with active gastric ulcer are generally successfully treated under a medical regimen.

We are indebted to Dr. F. W. Rolph for three cases included in this series. We are under special obligation to Dr. A. C. Singleton, of the X-ray Department of the Toronto General Hospital, who personally carried out a very careful radiological investigation in every case.

METASTASIS AND METASTASES*

BY EGERTON L. POPE

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THE sparsity of reference to this subject in the sphere of internal medicine and its literature makes it almost presumptuous if not actually felonious for a physician to bring forward a topic that is so traditionally surgical. Nevertheless, if account be taken of the varied clinical pictures to which metastasis gives rise it will be realized that it possesses a very important terrain in medicine.

DEFINITION

In considering the subject of metastasis it is important to adopt some sort of definition lest we find ourselves too deeply involved in the broader subject of the systemic dissemination of disease agents and disease processes. It may not be unjustifiable to state that the term metastasis is sometimes loosely employed in this respect.

Etymologically, the term metastasis is in reality a Greek word, *μετάστασις*, meaning (1) a removal from one place to another; (2) a changing or change; (3) a change of political constitution or revolution. Fortunately for the physician, its application in medicine is restricted to the first interpretation without economic or other unscientific reactions. According to Rose and Carless the term metastasis is an old fashioned name for the transference of acute inflammatory foci from one place to another, and the use of the term should be restricted to the remote transference episodes of mumps. They imply that the proper term is "embolism". Medical literature however, has not taken this stand and the subject can only be pursued under the old name. It is analogous to the retention of the term "typhoid" in place of the more scientific "enteric". The medical dictionaries define metastasis as "the transfer of a diseased process from a primary focus to a distant one by the conveyance of the causal

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Medicine, Ottawa, June 23, 1937.

agents through the blood vessels or lymph-channels." This definition suffices admirably for a generalization of the concept.

THE BIOMECHANISM OF METASTASIS AND IMMUNITY

Disease processes may be carried from a local lesion by the arteries, the veins, or the lymphatics to proximal or so-called regional areas and to distal remote areas. The causal agents that are so conveyed are either infective or neoplastic. Of the infective agents, bacteria, protozoa and fungi are those most commonly coming within the application of the term. Of the neoplastic agents, the malignant growths have special metastatic propensities. Given a point of entrance or development, these agents may or may not be transmitted to one or several other tissues. The determining factor would appear to be the degree of immunity or vulnerability of the host, even in the case of the neoplastic. The process of metastasis, therefore, seems to suggest one common relationship between infection and neoplasia as belligerent allies.

SITES OF ELECTION

There are some tissues which are the commoner sites of metastatic deposits. These include the pulmonary, the circulatory, the alimentary, the renal, the osseous, the neural, and the dermal. This fact applies in a general way to both the infective and the neoplastic causal agents. The organs most frequently attacked are the lungs, the heart and the blood vessels, the liver, the spleen, the kidneys, the bones and joints, the brain, and the subcutaneous tissues. Less frequently the pancreas, adrenals, and ureters may share in the process. Depending upon the tissue harbouring the original focus of a causal agent, metastases have predilections for certain organs, though not to the degree of exclusive specificity. The most that can be said is that, given a metastasizing lesion in a certain tissue, the metastatic deposition favours a peculiarly related organ or tissue but is not necessarily limited to it.

As an aid to synthesizing the subject it may be borne in mind that there are three vascular areas involved, (1) the systemic; (2) the pulmonary, and (3) the portal. The accompanying table, from Gibson, may be of assistance in visualizing metastatic predilection in a general way.

TABLE I.

Primary lesion	*Metastatic lesion*
1. Systemic	Pulmonary (systemic)
2. Pulmonary	Systemic (pulmonary)
3. Portal	Portal {pulmonary / systemic

In a word, general hæmic invasion may result from a primary lesion in any of these areas. Not infrequently general hæmic invasion may exist without a demonstrable primary lesion—the so-called cryptogenetic type. On rare occasions even the autopsy table fails to reveal the primary focus, in spite of the revelation of widely disseminated metastases and their effects.

INFECTIONS AND METASTASES

The infections of the septicæmic type are the most important in this respect. These include:

1. Coccal: (staphylococcus; streptococcus; pneumococcus; meningococcus).
2. Bacillary: (typhoid fever; tuberculosis; *B. coli*).
3. Protozoan: (syphilis; amœbiasis).
4. Fungus: (actinomycosis).
5. Undetermined: (as in parotitis epidemica).

Indeed, there are few if any blood infections that do not show metastatic phenomena in some form. In the last analysis even the typical skin rashes of the exanthemata may be regarded as metastatic.

The common origin of infective metastases is a localized thrombo-phlebitis (primary lesion). Such a primary lesion is necessarily one involving the respiratory, alimentary or dermal tissues, that is, the tissues that are specially exposed to bacterial contacts. From this emboli are discharged into the venous circulation and most commonly find their way to the lungs *via* the pulmonary arteries, where the process of infarction or abscess formation is established. Nevertheless, the pulmonary capillary vessels may carry infective emboli away from the pulmonary to the systemic circulatory system by the pulmonary veins, traversing the left heart and onwards, to set up infarcts or abscesses in any of the viscera without fear or favour. It is for this reason that in the event of the heart valves becoming infected, it is the left side of the heart that is usually involved. From these valves—the mitral and the aortic—emboli are carried most often to the spleen, kidneys and brain, causing corresponding symptoms of painful splenomegaly, hæmaturia, pyuria, and hemiplegia. Less frequently perhaps, minute emboli

are carried to the superficial vessels of the skin where they produce petechiæ; to the subcutaneous tissues, constituting purpuric episodes; to the muscles, with painful myositis or muscle abscess; to the myocardium, with coronary embolism; to the bones, with osteomyelitis; or to the intestines, with colic and melæna, simulating numerous abdominal conditions that are difficult to differentiate. The serous tissues, too, are susceptible to such embolic episodes, the pleura, the pericardium, the peritoneum, the joints, and the meninges. The corresponding clinical pictures are pleurisy and pleural effusion, pericarditis with or without effusion, peritonitis, arthritis, and meningitis. It is difficult to comprehend the subtle predilection of the metastases of mumps for the gonadal glands, and, rarely, for the pancreas.

NEOPLASIA AND METASTASIS

The formation of metastases in the case of neoplasia is said to have two phases: (1) the penetration of the endothelium of the lymph channels or blood vessels by the cells of the primary tumour; (2) the conveyance of tumour cells by this means to remote tissues, where they become arrested and lead to a new vascularization which establishes the secondary or metastatic growth.

By experimentation it has been found that rapidly growing primary tumours are much more effective in the establishment of secondaries than are those of more tardy development. Further study indicates that the failure of tumour cells to invade the vascular endothelium is associated with a process of vacuolation which leads to their rapid disintegration. Metastatic deposits of sarcoma of luxuriant growth are found to be associated with less tendency to vacuolation and greater tendency to vascularization by the vasa vasorum when the lumen of a vessel becomes filled. In other words, "the property of the cells which favours metastasis is a capacity for rapid growth leading to organic union with the vessel wall before vacuolation occurs".

In general it is stated that carcinoma tends to be disseminated by the lymph channels, while sarcoma tends to be carried by the blood-vessels.

In the matter of neoplastic dissemination there is perhaps less anatomical rationale than in the case of the infections. The reason for this is claimed by the pathologists to be what they call the principles of "circuitous" or "retrograde" metastasis. Lymph-channels having become diseased and therefore obstructed, new anastomotic channels are established, and in the process of making detours unusual tissues become affected. Christopher, of Evanston, states that "retrograde metastasis is one of the most important of all the pathologic processes controlling the distribution of cancer".

A study of the location and frequency of cancerous metastases in 10,130 deceased patients by the late John B. Murphy showed these very interesting figures:

TABLE II.

Carcinoma of	*Cases*	*No. with metastases*	*No. without metastases*	*Not stated*
Breast	3,000	1,779	349 (11.6%)	872
Stomach	2,856	1,664	678 (23.7%)	514
Uterus	1,626	655	679 (41.7%)	292
Œsophagus	660	560	95 (14.3%)	5
Kidney	579	219	64 (11.0%)	296
Tongue	241	185	15 (6.2%)	41
Liver	227	39	9 (3.9%)	179
Prostate	179	31	4 (2.2%)	144
Ovary	160	29	5 (3.1%)	126
Gall bladder	136	106	16 (11.7%)	14
Rectum	135	75	30 (22.2%)	30
Bladder	122	23	11 (9.0%)	88
Pancreas	109	78	13 (11.9%)	18
Lungs	95	67	9 (9.4%)	19
Large intestine	90	33	33 (36.6%)	24
Thyroid	57	3	3 (5.2%)	51
Lips	38	10	24 (63.1%)	4
	10,310	5,556 (53.8%)	2,037 (19.7%)	2,717 (26.0%)

(Murphy)

Surveying this list, deducting the 26 per cent of cases in which metastatic formation is not stated, we find the following record of metastephilous forms of cancer in their order of precedence.

TABLE III.

	Percentage
Tongue	92
Prostate, Lungs	88
Gall bladder	87
Pancreas	86
Ovary, Œsophagus	85
Breast	84
Liver	81
Kidney	77
Stomach, Rectum	71
Bladder	68
Large intestine, Uterus, Thyroid	50
Lips	30

These are startling figures and suggest that cancer, like septicæmia, is a constitutional disease, that a want of immunity predisposes to the formation of the primary lesion as a result of trauma or irritation and to the metastatic episodes that follow in its train. Just as we may think of typhoid fever and pneumonia as septicæmias with elective primary lesions in the intestines and lungs, respectively, so we may well think of cancer as a neoplasmæmia with selective primary lesions in almost any of the organs in accordance with more subtle, more confusing, and less precise elective processes.

SITES OF ELECTION

Statistics vary in relation to this phase of the subject. In the more common forms of cancer the preponderating tendencies of widespread metastasophilia appear to be these:

Mammary cancer.—(1) Regional lymph-nodes; (2) lungs and mediastinum; (3) liver; (4) bones; (5) brain.

Gastric, colon and rectal cancer.—Regional lymph-nodes; (2) liver; (3) lungs; (4) peritoneum; (5) bones.

Uterine cancer.—(1) Regional lymph-nodes, (*a*) lumbar, (*b*) retroperitoneal, (*c*) inguinal; (2) liver; (3) bones.

Kidney cancer (hypernephroma).—(1) Lungs; (2) bones; (3) liver; (4) intestine; (5) retroperitoneal lymph-nodes; (6) skin.

Prostatic cancer.—(1) Regional lymph-nodes; (2) remote lymph-nodes; (3) bones; (4) liver; (5) lungs; (6) spinal cord.

Lung cancer.—(1) Mediastinal nodes; (2) liver; (3) mesenteric and retroperitoneal lymph-nodes; (4) brain; (5) bones.

Thyroid cancer.—(1) Regional tissues undergo early invasion; (2) bones, especially of cranium.

Thyroid cancer is rare. Metastatic lesions may dominate the picture, and the patient may not be aware of any thyroid lesion. Alfred Haas, of Munich, states that "carcinoma of the thyroid has one important characteristic which distinguishes it from carcinoma elsewhere; it relatively seldom gives rise to metastases in the lymphatic system, but frequently the large thin-walled veins on the surface of the goitre are invaded and dissemination takes place by the blood-stream." The most frequent sites of metastases are the bones, as commonly as in the case of the prostate. The order of frequency is skull, spine, sternum, humerus, femur, ribs, pelvis, clavicles, jaw, radius, os calcis. Visceral metastases occur in the lungs, liver, brain.

TABLE IV.

UNIVERSITY OF ALBERTA HOSPITAL

Analysis of 60 cases of carcinoma of the breast with metastases.

(1) Axillary node metastases without others	30
(2) Axillary node metastases with others	30
(*a*) Cervical nodes (one with brachial plexus and sympathetic involvement)	2
(*b*) Mediastinal nodes	2
(*c*) Lungs	7
(*d*) Lungs and bones (one with spontaneous fracture)	3
(*e*) Bones (three with spontaneous fracture; one with paraplegia)	8
(*f*) Liver	3
(*g*) Liver and brain	1

SPECIAL TYPES OF METASTATIC NEOPLASMS

1. *Angio-endothelioma and diffuse endothelioma of bone* (malignant bone aneurysm).

2. *Melanoma* (melanotic sarcoma).—Metastases are selective of skin, lungs, liver, kidney, brain, *et al.*

3. *Hypernephroma* (Grawitz).—Predilection for widespread dissemination in the bones.

4. *Wilm's mixed tumour of the kidney* (embryoma).—(Leiosarcoma, rhabdosarcoma, myxosarcoma, chondrosarcoma, adenosarcoma, teratoma, dermoid, etc.). Metastases only occur when sarcomatous or cancerous degeneration occurs (25 per cent).

5. *Ewing's tumour* (endotheliomyeloma); diffuse endothelioma of bone.—Early and extensive metastases prevent a cure, although the tumour is radiosensitive.

Metastases are characteristic also of certain diseases with neoplastic propensities: (1) multiple myeloma; (2) lymphoblastoma: (*a*) Hodgkin's disease(?), (*b*) lymphosarcoma, (*c*) the leukæmias.

The pathology of multiple myeloma is controversial, but the characteristic tumours in the bones are regarded as primary in the flat bones containing red marrow. Metastases, though not part of the disease, may be found in the intrathoracic and intra-abdominal viscera.

The pathology of Hodgkin's disease is still too wrapt in mystery for one to be able to distinguish the primary from the metastatic aspects of the disease. Suffice it to say that, while the primary process is located in the reticulo-endothelial system, there may be a very generalized invasion of visceral and osseous tissues which not infrequently causes clinical confusion with other metastatic diseases.

The lesions of lymphosarcoma, while occupying sites similar to those of lymphadenoma, are distinguishable histologically in biopsies as homogeneous, in contrast with the heterogene-

Etiology.—The specific etiology of trifacial neuralgia is still unknown. Most writers in the past have felt that it was caused by a pathological condition within the Gasserian ganglion, but pathologists have been unable to demonstrate any specific pathological changes. Adson[2] is inclined to believe that the cause of this disease may be of central origin and that the palliative and radical treatment does nothing more than to interrupt the sensory reflex.

Symptoms.—Trifacial neuralgia is characterized by a sharp, sudden, severe, agonizing, shooting pain extending along the ramifications of one or more of the branches of the fifth nerve which is not controllable by any sedative. The attacks are brought on by irritation of the area involved, such as moving or touching the lips, cleansing the teeth, washing the face, eating, talking, or by sudden exposure to air or sound. During a paroxysm the patient's face may be highly flushed, and he may rub his face with sudden energy. He may often groan, and manifests an expression of extreme agony. When the maxillary division is involved the eyes are congested, lacrimation is increased, and running of the nose is common during a spasm. Between attacks the patient often converses with lips immobile. The attacks are of short duration, lasting from a few seconds to a minute or two, and are usually followed by a period of complete relief lasting from a few minutes to several hours. The third, second and first divisions of the fifth cranial nerve is the order in which they are most frequently involved.

While trifacial neuralgia may occur in early or late life it is most common after the fourth decade. Usually only one side of the face is affected, but Adson[2] reports that in about 2 per cent of cases it is bilateral, with a history of more severe pain on the side on which it began. Men and women are about equally affected.

The paroxysmal pain at first may only last for a few weeks, with an interval of relief for months, but as the disease progresses the attacks are of longer duration and of greater intensity. At first the patient very often complains of the pain being localized in one or more teeth, the removal of which, however, fails to clear up the condition. On the other hand the pain may be over an antrum, the treatment of which fails to benefit the patient. There is almost no type of therapy which has not been tried for this affliction. Adson[2] points out that "One must remember that the attack may pass spontaneously into a quiescent stage, and not infrequently various types of treatment are credited with affecting relief when in reality the cessation of pain is more or less coincidental".

Differential diagnosis.—As several forms of severe facial pain exist, and since the success of the treatment depends directly on the accuracy of the diagnosis, it might be advisable to review the other lesions that cause facial pain. Migraine is easily differentiated as trifacial neuralgia is not associated with headache. In the case of sinus infection the pain is more or less constant and very often is associated with local tenderness; moreover the pain is not aggravated by external stimulation or irritation. Facial pain of definite dental origin caused by infection in or about the teeth is often throbbing but is usually more or less constant. If the pain persists pathological evidence will soon be seen in the dental radiographs, and this together with the vitality test, tenderness to percussion and sensitivity to heat or cold will clinch the diagnosis in these cases. Another important point in the case of pain from dental caries or degenerating pulp is that the pain persists after the patient retires, whereas in cases of trifacial neuralgia the pain at the onset is rarely initiated during the patient's sleep. The presence of pulp nodules may give rise to local or reflex facial pain, but here again the pain is not paroxysmal nor can it be compared with the severe pain of trifacial neuralgia.

Glossopharyngeal neuralgia is the second important primary type of neuralgia. It compares clinically with trifacial neuralgia but the pain follows the distribution of the ninth or glossopharyngeal nerve. The attacks are intermittent and paroxysmal, as in trifacial neuralgia, and occur about the same time in life. In this neuralgia the needle-like pains flash between the tonsillar fossa and the ear, and are usually brought on by swallowing, yawning, coughing, talking or laughing. The treatment is section of the ninth nerve.

Sphenopalatine neuralgia, "Meckel's tic", "Sluder's tic", is a "lower half headache", and is characterized by a persistent, boring pain situated apparently in the maxilla. Sphenopalatine neuralgia is rare compared with trifacial neuralgia, and is not usually severe enough to incapacitate the patient unless he is of a neurotic type. The diagnosis can be easily confirmed by cocainization of the sphenopalatine ganglion.

Tumours of the Gasserian ganglion are extremely rare, and when present may produce major trigeminal pain. In such cases, however, anæsthesia of the face occurs, gradually involving the entire area of the distribution of the trigeminal nerve.

Treatment.—The only therapeutic measures known to be effective at the present are deep injections of the nerve and division of the sensory root. Schlosser,[4] of Munich, is credited with being the first to advocate the use of alcoholic injections for treatment of this disease, and in 1903, reported a series of experiments which he had commenced in 1896. In 1898 Spiller,[5] in collaboration with Keen, suggested section of the sensory root posterior to the ganglion, provided it could be shown that regeneration could

not take place afterwards. This procedure was first carried out by Frazier[6] in 1900.

Palliative treatment.—During the World War a volatile drug, trichlorethylene, was discovered to have a selective effect on the sensory portion of the fifth nerve. This phenomenon led to experimentation with it as an inhalant in the treatment of trifacial neuralgia. Much was hoped for from this drug but the results have been very disappointing. In Adson's[2] opinion there is no specific medication of any material value, and he thinks that inhalations of trichlorethylene, thirty drops on a sponge, administered every two or three hours may minimize the symptoms of pain. Rowe[8] reports little benefit from its use in his cases, and points out that its administration was often followed by sensations of dizziness and fullness in the head so disturbing that patients gave it up after a few trials.

Deep alcohol injection of the maxillary or mandibular nerves at their points of exit from the skull provides the most complete and effective relief of any of the various palliative measures. Superficial injection of the peripheral branches at the mental, infra-orbital and supra-orbital foramina offers slight relief. In some cases one may get an excellent result, and two of these cases will be reported below. The average period of freedom from pain following a deep injection is nine months. Frequently relief of pain is obtained from deep injection for a period of from two to three years. Benefit derived from an injection depends directly on the proximity of the deposition of the alcohol to the affected nerve. Treatment by this method does not require hospitalization, and entails neither the morbidity nor the mortality of operation. The procedure may be repeated, but subsequent injections are more difficult to make on account of scar-tissue formation, and less effective because this new tissue steadily decreases the penetration of the alcohol. Adson[2] does not believe an injection should be done more than three times.

Deep alcohol injection should nearly always be performed for three reasons. (1) If injection of alcohol is successful in relieving the pain the diagnosis of trifacial neuralgia is confirmed; (2) it offers temporary relief of pain to dehydrated and emaciated patients who are not good operative risks; (3) it helps to educate the patient as it acquaints them with the numbness or "woodeny" feeling which will follow section of the nerve. Deep alcohol injection is most successful where only one division is involved in the disease. It is more difficult to block the ophthalmic division, as one hesitates to inject a large amount of alcohol deep into the orbit. (I have never attempted to block this division). One may not always be successful in blocking the nerve on the first injection, but there is no contraindication against repeating the procedure in a few days' time.

Some men prefer to make the injection while the patient is in the analgesic stage of a nitrous oxide and oxygen anæsthesia. The cases which I am reporting were premedicated with morphine sulphate, gr. 1/6, and hyoscine, gr. 1/120. A small amount of novocaine was used superficially and a small amount deposited ahead of the needle as it made its way into the deep tissues. As one approaches the nerve trunk some pain is usually experienced. When the alcohol is deposited the patient has a few minutes of severe pain similar to a paroxysm. In my experience this instigation of a severe attack has been a good sign. The deep injection can be done either intra- or extra-orally. In my experience I have met with good success by injecting the third division intra-orally (foramen ovale), but have had much better success by using the extra-oral route when blocking the maxillary branch at the foramen rotundum. I have deposited up to 3 c.c. of 95 per cent alcohol in my deep injections. One must be careful not to deposit any alcohol in the muscle tissue. It has been my practice to have the patient move his eye from side to side as the alcohol is deposited to block the maxillary division. In this way one may quickly and readily see if the sixth cranial nerve is being affected, as it supplies the external rectus muscle of the eye. This latter condition is more apt to follow injections of alcohol into the Gasserian ganglion.

One meets occasionally a trifacial neuralgia with the pain starting over the infra-orbital foramen, running down into the cuspid area into the upper lip, over the side of the nose, and up over the bridge of the nose toward the forehead. I have two cases in elderly patients where I have obtained relief for them by injecting 1 c.c. of alcohol into the opening of

the infra-orbital canal. The nerve in this position is much more accessible than at the foramen rotundum. Each of these patients has had three injections. When so much fibrous tissue has formed in this area that penetration of the alcohol is interfered with one may still give these patients relief by doing the deep injection.

The infra-orbital foramen is best blocked extra-orally. Although many men shun this injection in dental practice on account of their fear of getting into the orbit by way of the canal, one has only to pass a needle through this foramen into the canal to actually learn how difficult it is to do. My practice is to inject about 1 c.c. of novocaine, and when this has taken effect, one is then able to palpate and feel for the opening with the needle. To get a successful result the needle should be just inside the canal, and 1 c.c. of alcohol is all that is necessary to deposit in this area. Alcohol has a destructive effect, especially on loose connective and nerve tissues. Skin and muscle tissues are not affected to the same extent. The pathological process is an aseptic necrosis. The necrosed tissue is replaced in time by a fibrous connective tissue. Following the injection of alcohol one may notice slight paralysis of the muscles of mastication. Motor fibres recuperate or regenerate more quickly than do the sensory ones.

The patient should always be informed that the injection of alcohol will only give temporary relief, and that a permanent cure can only be obtained by severing the sensory root of the fifth nerve within the cranium. He should also be informed that this operation when performed by an expert carries a mortality of less than 0.5 per cent and that complications are rare.

CASE 1

Mrs. V., aged 45 years, was first seen on November, 28, 1932, complaining of a hot burning, stabbing pain in the lower right jaw and lip. Her first attack had come two years previously and had felt like a toothache. She had had a molar tooth extracted but got no relief. A second molar tooth was removed, and following this she got relief until June 1, 1932, at which time the pain returned in a very severe form. In October she had three more lower teeth removed, with no relief. Attacks of pain now came at night as well as in the daytime and she was afraid to eat, sleep or talk for fear of precipitating another attack. She was continually smacking her lower right lip, and had been using oil of wintergreen on the gum but no form of medication had relieved her pain. One city hospital had made radiographs of all her teeth and reported the upper right first molar to be diseased. They had also reported thickening of the mucous membrane of the right antrum and had advised drainage. The patient had never had a single restoration made in any of her upper teeth. In my opinion the first molar was negative in these x-ray films and tested normally for vitality. There was no clinical symptom or history of sinus infection.

I did a right mandibular injection, and deposited 4 c.c. of 2 per cent novocaine at two o'clock in the afternoon. Paroxysmal pains stopped and did not recur until eight o'clock that evening. The following day I did a deep injection extra-orally and deposited 2 c.c. of alcohol to block the mandibular nerve. The patient was greatly relieved but not completely. On December 2nd I re-injected this nerve and deposited 2 c.c. more of alcohol. The following day the patient had complete anæsthesia over the entire distribution of the mandibular branch of the fifth nerve, with complete relief of all pain and came in looking like a new person.

I removed a tooth for Mrs. V. on July 29, 1937, and she reported that she had not had an attack since being injected. She stated, however, that she had felt the pain was going to return on one or two occasions.

CASE 2

Mr. M., a farmer, aged 36, was first seen on September 24, 1935, complaining of a severe neuralgia of the upper right jaw. Six years previously he had experienced a sudden, severe, excruciating pain, which he described as a hot flame, that started in the region of the apex of the upper right cuspid tooth, travelled up toward the eye, into the side of the nose and upper lip, and back through the upper jaw to the region of the condyle. An attack lasted only a few seconds but might recur in one-half hour. However, he was usually free for a longer period of time. Between attacks he had felt fairly well. Attacks of pain lasted one week and then disappeared for six months. Mr. M. has had periodic attacks since that time. In July, 1935, the patient had a recurrence of very severe pain. Dental radiographs revealed a lower right impacted third molar. This tooth was removed, with no relief. Since that time he had been afraid to wash, shave, eat or even touch his face in case he might bring on another attack. The patient had come directly from a three weeks' stay in one of the largest city hospitals. While there his sinuses were investigated but no definite diagnosis had been made.

I did a diagnostic infra-orbital novocaine injection. Following this an attack could not be precipitated, but still he complained of some pain in the posterior part of his maxilla. He had relief for two hours. On the following day, September 25, a deep alcohol injection of the maxillary nerve was done extra-orally and 3 c.c. of alcohol deposited. He got relief immediately. The following day he said "I felt so good last night that I did not want to go to sleep and the nerve feels as if it is trying to twitch but can't".

On September 21, 1937, the patient returned. Physically he was much better, and reported that he had been able to do his work until July of this year, at which time he had a severe attack. On September 19th, after eating breakfast, he had precipitated another severe attack upon blowing his nose, and since then had had no relief. I did a deep alcohol injection extra-orally and deposited 3 c.c. of alcohol. He was completely relieved. Numbness in the nose and cheek was more profound than that following the previous injection. I again advised this patient to prepare himself for a future radical operation as I felt that only one more injection should be made.

CASE 3

Mrs. G., aged 52, was first seen on September 11, 1933, looking very haggard, and complaining of sudden, recurring, stabbing pains through the left side of the face starting at the angle of the jaw. The first attack

had come on suddenly three weeks previously. At first there were from four to five attacks a day but now they were coming much oftener. The attack that morning was so severe that she was given an injection of morphine sulphate without relief. I did a mandibular injection of 2 per cent novocaine, and following this could not precipitate another attack. The lower left second bicuspid, which was badly broken down, was removed. The patient spent a comfortable afternoon but had a recurrence of paroxysmal pain the following day. A deep injection was done intra-orally and 3 c.c. of alcohol deposited. She slept most of the day, felt, and looked much better the following day, and reported anæsthesia of the lower left lip and jaw. In September, 1937, Mrs. G. reported that she had not experienced a severe pain since the date of injection but had had slight occasional shooting pains, which however, were not serious enough to complain about.

CASE 4

Mrs. B., edentulous, aged 61, was seen on March 21, 1934. On March 6th she had gone for a car ride, and the next day at 4.00 a.m. suddenly awakened with a severe stabbing pain through the left side of her face. At 9.00 p.m. she had another attack. She tried to sleep sitting up. She had another attack at 5.00 o'clock the next morning, and was taken to hospital, where she stayed there for four days, having from three to four attacks each day. She was given morphine hypodermically but returned home with no relief. The diagnosis was trifacial neuralgia involving the second and third divisions on the left side. Her blood pressure was 208/85. The urine showed acetone and traces of sugar. The blood sugar varied from 200 to 238.

Deep alcohol injection was done, to block the second and third divisions, with partial success. This patient was injected twice more for each division before complete relief of pain was obtained. She was dismissed on April 4th, at which time she was wearing her dentures and feeling quite happy.

This is the most obstinate case that I have met with, and I include it to show that one injection does not always give the desired result. This patient on account of her hypertension and diabetes was in no condition to stand operation.

CASE 5

Mr. H., aged 77, was first seen in July, 1934, complaining of a very severe shooting pain which started in the infra-orbital region, passed down into the cuspid area, over the side of the nose, and up over the bridge of the nose into the forehead on the left side. The left eye was markedly congested and the face flushed. During an attack the tears poured out of his left eye. He stated that he had tried everything but had obtained no relief. This patient was edentulous. His pain had started more than a year previously, and his attacks of pain were then so bad that he had trouble eating, shaving, talking and washing his face. I did an infra-orbital injection extra-orally, and deposited 1 c.c. of alcohol, which gave him relief for approximately one year. I re-injected him in July, 1935, and he was free until the end of November, 1936. I again injected him on January 18th of this year, depositing 2 c.c. of alcohol. This man is now eighty years of age. It is my opinion that one is warranted in re-injecting a case of this kind as long as one can obtain a good result.

CASE 6

Mrs. B., aged 65, was first seen in July, 1935, suffering from a severe trifacial neuralgia involving the terminal branches of the infra-orbital nerve. One c.c. of alcohol deposited just inside the infra-orbital foramen gave her relief until July, 1936. She was again injected and given relief until March, 1937. At this time I re-injected and deposited 2 c.c. of alcohol, and she has been free from her pain since that time.

SUMMARY

1. Trigeminal neuralgia is characterized by paroxysmal attacks of excruciating facial pain, aggravated by contact or motion and not relieved by any ordinary medication.

2. The only satisfactory measure to relieve this pain is deep injection of the nerve with alcohol. The only permanent relief is section of the sensory root.

3. If the diagnosis is doubtful the injection of novocaine will verify it.

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CHRONIC PORTAL OBSTRUCTION.—V. Lozzi after an allusion to the non-success of the usual surgical treatment of ascites in hepatic cirrhosis, considers the various venous anastomoses which have been effected. He remarks that Rosenstein's union of the inferior vena cava and the portal vein demands virtuosity even in a surgeon experienced in vascular operations, and regrets that anastomosis between the superior mesenteric and portal veins, as done by Bogoraz in 1912 and Krestiowsky in 1926, has not more often been tried. He has found that such a union remained pervious in seven out of ten dogs. The same operation has been done on an alcoholic subject, aged 49, with hepatic cirrhosis, and in a woman, aged 26, with portal thrombosis. Both made good recoveries, and the rate of accumulation of ascitic fluid was afterwards considerably less. Lozzi prefers a lateral anastomosis to the termino-lateral union made by the others, and regards a stoma of at least 15 mm. in diameter as essential. A less drastic proceeding proposed by the author is anastomosis of a radicle of the inferior mesenteric vein or of the ileo-colic vein with an iliac vein; this method was tried by Ghiron without success.—*Rinasc. med.*, June 15, 1937, p. 371. Abs. in *Brit. M. J.*

THE PROBLEM OF THE DEAF CHILD*

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THE deaf in Canada are almost a neglected section of the population. In England there has been a growing appreciation of the extent to which impairment of hearing has become an economic factor and handicap; there is government recognition and provision for the deaf of all ages and conditions; accurate information is available under the auspices of a National Institute for the Deaf, so that all concerned can receive information regarding diagnostic clinics, places for treatment, and schools for education; last and not least a serious attempt is made to prevent the exploitation of the deaf. The United States too has awakened to the importance of what is now recognized as a great national problem; great surveys are being undertaken and one of the best of these stated some years ago that there were approximately 45,000 deaf mutes, 3,000,000 children with subnormal hearing, and over 10,000,000 persons with some defect in hearing in the United States. In Canada there are a few schools for the education of the hopelessly deaf. Apart from the information available at these institutions there is practically no knowledge of the number of deaf and the severity of the deafness, and no attempt is made to help the deaf in their search for improvement or employment, and none at all to prevent their exploitation.

Deafness is a condition in which the pædiatrician should be vitally interested but in which he has up to now displayed little interest, essentially because of his lack of appreciation of its importance. Deafness is either congenital or acquired. By far the greater part of the latter comes on during childhood, and the beginning of the remainder of deafness has its origin in childhood. Deafness, therefore, presents a challenge to the pædiatrician.

The information in this paper has been gathered from many trustworthy sources, and is an attempt to bring together for the information and interest of the pædiatrician a summary of the facts and ideas regarding deafness which may prove of help to him in practice. The subjects discussed are the causes of deafness; how the different types of deafness are recognized; what can be done for deafness; what can be done to prevent deafness; and, finally, what is being attempted by way of investigation of the great problem.

THE HEARING MECHANISM

From the physiological point of view the organ of hearing consists of two parts; first, the sound-conducting part, which includes the external, middle and part of the internal ear, and, second, the sound-perceiving part, which includes the organ of Corti, part of the auditory nerve, and the auditory centres in the brain. The first of these is the mechanism for collecting the sound impulses that originate in the outer air and for bringing them into contact with the terminal apparatus of the nerve of hearing. The second of these is the mechanism for transforming these physical sound waves into nerve impulses and for conducting them to the cortex of the brain where the actual perception of sound takes place. Defects in hearing caused by changes in the first of these are called obstruction or conduction deafness, and defects in hearing that are due to impairment of the nervous mechanism are called nerve deafness or perception deafness.

Few medical men are aware that up to 1926 practically nothing was known of the physiological function of the ear. The Helmholtz and other theories of hearing are based almost entirely on the anatomical and histological structure of the ear, and are, therefore, theoretical. This deplorable lack of knowledge was due to the fact that there was no satisfactory method for the study of the physiology of the ear. In 1923 accurate measurements of hearing by mechanical means became available for the first time, through the simplification and perfection of the electric audiometer by the Bell Telephone Laboratory. In April, 1930, Wever and Bray, of Princeton University, discovered the first

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physiological method for the study of the organ of hearing. This invention and this discovery have marked an epoch in otology, and are the basis of a vast amount of research now going on in physiological laboratories all over the world, and the information already obtained has modified our knowledge and treatment.

THE CAUSES OF DEAFNESS

Some deafness is congenital in origin, and a serious form of deafness, oto-sclerosis, is also congenital, in that the tendency to it is inherited. Some deafness is due to errors in development. This error may affect any one or more parts of the conduction mechanism or of the perception mechanism. It is known that these developmental defects rarely involve both the external and inner ear simultaneously.

Many physicians have seen children with small, or multiple auricles, or with atresia of the external canal. The anomaly may be bilateral, but the internal ear in these children is usually quite normal, and consequently there is little justification for surgical interference, at least so far as improvement of the hearing is concerned.

When the error in development affects the internal ear a variety of serious conditions may be present. Malformation of the bony and membranous labyrinth, absence or maldevelopment of the organ of Corti, malformation affecting both the cochlear and vestibular apparatus, maldevelopment of the spiral ganglion, are a few of the conditions that have been discovered by histological section. There are also possible abnormalities of the 8th nerve and of its intracranial connections, and of the auditory cortex, but of these nothing is known.

Another form of congenital deafness is that called the endemic form and associated with cretinism. The vestibular apparatus is usually normal, but the middle ear spaces are filled up by a myxomatous thickening of the submucous tissues, often filling up the niches of the windows. Many cretinic deaf mutes are really only hard of hearing.

Oto-sclerosis is a peculiar condition. It is a disease of adult life and shows itself as a patch of peculiarly staining spongy bone in the hard bone which surrounds the cochlea. The same type of bone change is not found in any other bone in the body. It may occur in many places in the hard bone surrounding the cochlea. Unless it involves the stapes it does not affect the hearing. In one instance three foci of oto-sclerosis were found in the left ear, in which there was deafness; but in the other ear, which had normal hearing, there were *four* foci of oto-sclerosis, one of which was in the typical site but had not actually invaded the stapes. Deafness in oto-sclerotics has been known to vary, and the explanation is given that the variation is due to the alternation of decalcification with re-deposition of calcium, but the greater the deposition of calcium, the firmer does the foot-plate of the stapes become ankylosed, and in consequence the deafness becomes greater and more firmly established.

Nearly all the remaining deafness can be classified under the heading "acquired" and is due in some form or another to inflammation. The earlier and the more severely these inflammatory conditions occur, the greater the tendency to deaf-mutism. Deaf-mutism rarely results unless the injury to the labyrinth has occurred in the first ten years of life. One of these injuries is trauma at birth. Fracture of the cranial base has been known to involve both internal ears. In other instances where the head of the newborn was traumatized, but less severely, hæmorrhage has been found all through the cochlea.

For the rest, acquired deafness is the result of infection, and, in the main, of infection in childhood. Reliable statistics show that when deafness in children was acquired 61.7 per cent had become deaf by the third year of life; by the fifth year 78.8 per cent had become deaf; and in only 10.4 per cent did deafness develop between the ages of five and ten. This acquired deafness of childhood is due to an infection of the middle ear, or to a toxic neuritis of the internal ear, or to both. Meningitis in infancy is the most prolific cause of acquired severe deafness; measles is next; scarlet fever next; and influenza next. Syphilis used to be considered a prolific source of congenital deaf-mutism, but its importance probably varies in different countries. In one public institution for the deaf in the United States 400 children were examined and only two had a positive Wassermann reaction. So that in parts of the United States, at any rate, syphilis does not appear to be an important factor in the etiology of severe deafness in children.

Deafness in the *external ear* can be caused by plugs of wax, boils in the canal of the ear, and myringitis.

Middle ear deafness is the result of lesions in the middle ear which have their origin in inflammatory processes originating in the nasopharynx. Examples of the lesions produced are: fluid in the middle ear, thickening of the mucous membrane lining of the middle ear, ankylosis of the joints between the ossicles, particularly ankylosis of the footplate of the stapes in the oval window; adhesions or abnormal masses of fibrous connective tissue blocking such places as the round window or impeding the action of the ossicles; impairment of action of the muscles: blockage of the Eustachian tube by a plug, by swelling of the lining, or by impaired lymphatic drainage. These impair the normal action of the middle ear mechanism. It has been shown experimentally that extreme tension of the tensor tympani muscle produces a fixation of the ossicular chain, and the transmission of low tones may be reduced until they are no longer audible.

Internal ear deafness is caused by such lesions as loss of the outer air cells of the organ of Corti; atrophy or swelling of parts of the organ of Corti; hæmorrhage in the organ of Corti, or in any one or more of the main compartments of the internal ear; degeneration of the spiral ganglion; degeneration of the spiral nerve; deposition of bone in any part of the internal ear.

The internal ear is set in the stony-hard petrous bone, and inside this is surrounded by a further layer of extremely compact bone. It is therefore relatively invulnerable to direct attack. It can, however, be reached through the blood stream, through the auditory nerve, and through the round and oval windows. The internal ear is known to be susceptible to certain drugs, prominent among which is quinine. It is extremely likely that nearly all of the degenerative changes produced in the internal ear are a result of a toxic neuritis produced by toxins reaching it from the blood stream (such as the toxin of scarlet fever and even diphtheria) because in many instances of severe deafness following the exanthemata there has been no otitis media. Meningitis produces similar degenerative changes in the nerve structures, probably by direct invasion through the cribriform plate at the outer end of the internal auditory meatus.

Deafness from lesions in *the auditory nerve* may be due to tumours from small to large in the internal auditory meatus, or abnormalities of the 8th nerve such as produce the so-called Menière's symptom-complex.

Very little is known regarding deafness due to lesions on the *intra-cranial connection* or on *the cortex*, but in regard to the latter an interesting observation has recently been made. It is taught that the acoustic centre of hearing is in the temporo-sphenoidal lobe of the dominant half of the brain. It has been shown, however, that there is no practical impairment of hearing in a right-handed person when the left temporo-sphenoidal lobe has been removed, and vice versa. Dandy has recently presented some evidence, following extensive brain surgery, which suggests that this localization in the temporo-sphenoidal lobe has been erroneous and that the cortical centre of hearing is probably in the left parietal cortex.

How Different Types of Deafness are Recognized

Deafness is difficult to detect in infancy, but at four months old an infant should recognize the human voice. Whenever there is a family history of deafness, deafness in the infant should be strenuously watched for. The earlier the defect can be discovered the better. It frequently escapes detection until the parents or the nurse notice that the child does not learn to speak at two years of age. The pædiatrician's problem is then to decide whether he has to deal with a very backward child or a true deaf mute. If the young child is lively and intelligent and clever with its hands it is not likely that it is dull in intellect. If, therefore, such a child takes no notice of the sounds around about it, it is because it is deaf. On the other hand, if the child does not smile when spoken to, and, takes little notice of the things it plays with or the sounds around about, the apparent deafness is likely due to lack of intellect.

Make enquiry regarding consanguinity and a family history of deafness, and ask if the parents think the child heard some months previously. When deafness is suspected thorough inspection of the ear drums is called for. In small canals pads of wax or epithelial débris are easily overlooked. The external ear should be thoroughly cleaned. Impairment of function of the Eustachian tube can result in accentuation of the

concavity of the drum, shown by prominence of the short process of the malleus and an indrawing of the handle of the malleus, so that it may look extremely short. More marked changes in the drum, such as thickening, inflammation, perforation, discharge, clinch a diagnosis of otitis media and call for the attention of an ear specialist. You are probably aware that marked changes in the drum membrane may be found with normal hearing. On the other hand what appear to be slight alterations in the appearance of the drum membrane may often signify adhesions in the middle ear. Such are to be referred to the otologist. The deafness produced by these is not progressive unless there are recurring attacks of acute suppurative otitis media.

The degree of deafness is often a reliable guide to the part of the organ of hearing at fault; very severe deafness cannot be produced by alteration in the sound conducting mechanism alone, while moderate defects of hearing may be. When deafness is suspected in the young child be on the outlook for simulation. The occasional child will feign deafness for its own convenience.

The young child suspected of deafness in rare instances cannot speak any words, in other cases it can say a few words such as "Mum" and "Dada". Such words are not, as the parents fondly believe, proof that the child has useful hearing; they are often picked up from imitation by close observation of the lips. Sometimes such words or sentences were learnt before the child acquired its severe deafness. So, the mere saying of words is not of paramount importance in diagnosis. What is of importance is the inflection and intonation of the words uttered. If they are flat and toneless the deafness may prove of the severest, but if they are reasonably modulated there is probably a remnant of hearing which can be used. The parents and school teacher should be advised that every child who requires to be told a thing twice should be examined by an ear specialist. The trouble may not be inattention, it may be deafness.

The child should be tested in many ways and in a natural friendly manner and with familiar sounds. A bell can be rung or a whistle blown or the hands clapped. Ingenuity is required. The same child is capable of saying that he doesn't hear a watch placed in contact with his ear and yet of telling you that he does hear it quite distinctly when it is hidden in your pocket. All examinations should be short. The main point is not to fatigue the child's attention.

The younger the child, the more difficult the determination of the presence of deafness. Having, however, made the diagnosis that there is real deafness present, the child should be sent to an otologist for differential diagnosis. He will return a reply that the child is feigning deafness, has slight, moderate, severe or extreme deafness, and will make certain recommendations which should be carried out. Do not expect him to make a diagnosis of otosclerosis, as a young house physician recently did for me. Otosclerosis is the greatest single problem in otology. Few otologists will venture this diagnosis before the age of twenty, and some take the attitude that it is undiagnosable with certainty during life.

The otologist will test the hearing in many ways, notably, by audiometers. It is commonly written that defects of hearing can be accurately determined by employing simple voice tests. This, however, is a legacy from the past. Voice tests of hearing of all sorts have been demonstrated to be unreliable as means of judging improvements or retrogressions in hearing. They vary with the state of mind and of liver of the examiner. They are particularly to be mistrusted when they are performed by a physician eager to demonstrate an improvement from his treatments.

The otologist will perform a caloric test with the head 60° back. If a horizontal after-nystagmus appears he will conclude that the semicircular canals are active, and therefore that such deafness as exists is congenital and that there is hope that the child's hearing will yet develop. If, however, the semicircular canals are inactive he will conclude that the ear damage has been acquired probably through meningitis, and that the prognosis for hearing is almost hopeless.

WHAT CAN BE DONE FOR DEAFNESS

It is a fundamental of good medical practice that every discharging ear should have adequate treatment. Such cases are, and should be, referred to the otologist. It should be the interest both of the otologist and of the general practitioner to treat not merely the suppurating process but also the deafness. The parents of a moderately deaf child should be advised as follows.

1. To go to an ear specialist for functional tests and otological examination.
2. To follow strictly his advice and treatment.
3. That the child should sit in the front seat in the class.
4. The teachers should be instructed by the physician to favour even the moderately deaf child by clear enunciation.
5. The moderately deaf child must not be sent to a special school for the hard of hearing. The latter should be reserved only for the very deaf.
6. An electrical hearing device should be provided, so that the child may have the maximum amount of help in receiving the instruction given to the rest of his class-mates. Care must be taken to see that the hearing device does not distort sound. This is best judged by watching the pronunciation of the child. The child will be quick to copy. He will copy the distorted sound as well as the correctly received sound. If there is much distortion it is proof that the instrument requires adjusting or else replacing.

As an argument to help a parent understand the necessity for buying an expensive hearing device for his deaf child, point out to the parent how unnatural his child's voice sounds in comparison with the voice of a child who hears normally. Tell the parent that the normal child has a pleasant voice because he hears the speech of others correctly, and that his deaf child has an unpleasant voice because of the inaccurate way in which he hears the voice of others. This alone should impel the parent to make the experiment of using magnified voice in the education of his hard-of-hearing child. Note that I am advising the use of an electrical hearing device for the purpose of the mental education of the deaf child. It is not for the re-education of the ear.

The physician should be warned against all methods of re-education of the ear by stimulating it with sounds. We know from experience that improvement in hearing does not occur from the use of an electrical hearing device, and we also know that over-stimulation by sound can actually harm the remaining hearing. A great many deaf mutes have some degree of residual hearing. Every attempt should be made to give such a child all the improvement that can be derived from a suitable electrical hearing device. Deaf children react favourably and quickly and show interest and give attention. It is remarkable how quickly the family responds and treats the deaf mute child naturally and in an intelligent manner.

Every young pædiatrician should visit the school for the deaf of his province. He would be surprised at the ingenuity shown in teaching deaf-mutes how to speak, and how they learn useful trades such as carpentry, gardening, shoemaking, wood carving, and how they are educated. Not long ago I saw one who had achieved a university degree.

WHAT CAN BE DONE TO PREVENT DEAFNESS

Deaf-mutism, mal-development of the internal ear mechanism, and otosclerosis are hereditary diseases. It is obvious that the most important step in the prevention of deafness is the prevention of congenital cases. Dr. James Kerr Love has elaborated this point very clearly.

"Medical readers do not require to have the principles of Mendelism explained to them. Mendelism is the only theory which explains the facts of hereditary deafness and it only requires a broad enough view of the theory to include not only the clearly hereditary cases, but the apparently sporadic cases as well. If the hybrid does not marry a deaf-born person and does not meet another hybrid, no deafness will follow in the offspring. But as there are three hybrids for every deaf-born person and as we have no test for such latent deafness—no test for a recessive—the prevention of congenital deafness will always remain a difficult, and, perhaps in part, an insoluble problem.

"Assuming then that Mendelism holds the key to the diminution if not to the extinction of congenital or hereditary deafness; assuming too, that we have a population willing to be guided, what suggestions may be made for the attainment of our object?

"1. The deaf-born or the children of the deaf-born should not marry into families in which any case of congenital deafness has occurred either in the direct line or in the collateral branches. Should such marriage take place sterilization or birth control or any other precaution seems justified. This should apply to the hearing members (hybrids) on both sides.

"2. As there are three hybrids (apparently normal people) for every deaf-born person, all hearing people, before entering marriage, should ascertain whether any case of congenital deafness has occurred among their relatives.

"3. Even the deaf-born may count on hearing children should he be able to marry into a pure hearing family.

"4. Even should all such precautions be observed congenital cases will occur, because the hybrids which seem normal will meet and the so-called sporadic cases will occur, but the scheme above outlined would result in the rapid diminution of congenital or hereditary deafness.

"5. During the last year of school life all children—now aged 15 years—should be instructed in Mendelism. This may be done as a short course in natural history. It is no use postponing such information till the deaf-born have fallen in love during their meetings in missions or clubs for the deaf.

"Such a scheme seems better than legislation for the prevention of deafness. It should never be forgotten that apart from their deafness the deaf-born become useful and capable citizens. But deafness is a great handicap. I have never heard, except in the pages of a novel, of a mother who hoped her child would be born deaf.

"It is unlikely that any ductless gland specific ending in 'in' will be discovered to combat congenital deafness. This latter is a defect—not a disease, and so far as we see at present will only be controlled by education and by prudent marriage."

Childhood is rightly regarded as the most precarious period in life so far as the ears are concerned. I have already stated that certain diseases of childhood — meningitis, measles, scarlet-fever and influenza—are the most important causes of both middle-ear and nerve deafness. It follows, therefore, that the most important way of preventing deafness is the safeguarding of the child's health during the pre-school years, particularly. Many mothers still cherish the belief that the young child should be exposed to the infectious fevers of childhood. I hope you will appreciate from what has been said that this is a seriously erroneous point of view. An older child is better able to fight off infection, while a young child purposely exposed to these diseases may become stone deaf as the result.

During these infectious diseases of childhood the ears should have daily inspection for the earliest signs of infection. It has been proved experimentally that small doses of diphtheria toxin placed in the middle ear rapidly cause deafness and extensive histopathological changes, such as rapid degeneration of the ganglion cells of the spiral ganglia. The inference to be drawn from this is that the ear-drums of children suffering from the infectious diseases should be incised at the earliest justifiable moment and that the incision should be made so adequate that drainage will be long maintained.

Otitis media and all its sequelæ, are among those causes of deafness which should be preventable. No step should be left untaken which will help to prevent recurrences of Eustachian tube infection. The first requisite is, therefore, the prevention of nasopharyngitis. The way to cure middle-ear deafness is to restore the nasopharynx to health before an incurable state of affairs has been set up in the middle-ear apparatus. This is the rationale for our insistence on cleaning out the adenoid. Dr. J. Grant Strachan, of our hospital staff, recently examined a hard-of-hearing child whose tonsils and adenoids had been removed without any improvement; in fact, the condition had been made worse. Additional history was given that each time the child's ears had discharged the hearing had temporarily improved. He discovered and removed a pad of adenoid behind each Eustachian cushion, with the result that there has been a tremendous improvement in the hearing.

Finally, if it be reasonably established that the existent deafness is progressive, every possible focus of infection should be eradicated and particular attention should be given to elimination and attention also be paid to the diet, particularly the intake of vitamin B.

WHAT IS BEING ATTEMPTED BY WAY OF INVESTIGATION OF DEAFNESS

Whereas fifteen years ago there was almost a complete lack of investigation of ear problems in English-speaking countries there is now marked activity in nearly every British and American medical school of importance. The investigations cover the entire field of biological activity. The anatomy, histology, physiology and pathology of the ear are being actively studied from many new points of view, and the science of otology is in process of being re-written.

Of great practical importance is the determination by experiment of the effect of various lesions in the middle ear and of various drugs and toxins on the hearing. Thus it has been proved that: multiple incisions, or an almost complete circular incision of the drum, has practically no effect on sound transmission, provided that the ligaments and joints of the ossicles are not injured; any experimental lesion that interferes with the mobility of the ossicles or increases the rigidity of the ossicular chain is always associated with a marked decrease in the transmission of low-frequency words and tones; extreme tension on the tensor tympani tendon reduces the transmission of low tones until they are no longer audible; while division of the tensor tympani tendon impairs the transmission of high tones. These experiments suggest that impaired function of the tensor tympani muscle may be one of the common causes of deafness. It has been shown experimentally that diphtheria toxin injected into the middle ear causes almost complete deafness and rapid irremediable degenerative changes in the spiral ganglia of the cochlea.

It has long been known that one of the drugs which can produce deafness is quinine. Recently, observation has been made suggesting that pre-natal medication of quinine is a possible etiological factor of deafness in the new-born. Obstetricians of standing, however, have statistically shown that the incidence of deafness in a large number of cases over many years, is as

great where no quinine has been administered as where quinine has been administered. On the other hand quinine has been found in heavy concentration in the spinal fluid of the new-born infant, and it must be seriously considered whether fetal idiosyncracy to quinine may not be responsible for congenital deafness in certain cases, and perhaps in many more cases than have ever been suspected. This matter is receiving experimental investigation, for, in spite of the great value of quinine in obstetrics, the tragedy of congenital deafness is so serious that obstetricians might well find other methods of sensitizing the uterus to contraction than by the use of quinine.

Through the American Otological Society efforts are being made in the United States and in Canada to correlate the research now being conducted so that the results in one laboratory are being checked in another and so that there is as little duplication of endeavour as possible. The experimental investigation of deafness is one of the most useful and promising fields of medical investigation of the day.

CONCLUSION

Finally, from the all-important view point of the education of the child, it is necessary to stress the necessity of recognizing defective hearing at the earliest possible age. Every infant is born dumb, but irremediable deafness at birth is rare. Later on, due to the sense of hearing, the child acquires articulate language. Infants who have some degree of deafness are comparatively common, but not infrequently the mother can so make use of the hearing a child possesses in the training of the child that it grows up with fairly useful hearing; but every infant born totally deaf will remain dumb. In the pre-school age hearing plays a decisive rôle in the learning of speech. The child does not learn to speak properly unless it has good hearing, and such ability to speak as it has may be lost or not maintained if it develops a hearing defect. The hard-of-hearing school-child suffers a very severe handicap, which is the more severe because frequently neither the parent nor the school teacher nor the physician has appreciated that the apparent stupidity of the child has its cause in deafness. Slight but significant hearing impairment is often the cause of retardation, a speech defect, an inferiority complex, or even unusual behaviour. Many children who have not been recognized as deaf or hard-of-hearing fail at school, and have to turn to other channels because they cannot keep up with their school mates. Educational authorities have discovered that there are several times as many repeaters among the hard-of-hearing children as among normal children, and that therefore the deaf child is an expensive burden. Along with this discovery they are becoming more and more awake to the fact that the handicap of deafness segregrates the deaf child from the normal child and makes him less fit to develop into a helpful citizen in his adult years.

POLIOMYELITIS: VITAMIN B DEFICIENCY A POSSIBLE FACTOR IN SUSCEPTIBILITY*

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DRAPER has defined poliomyelitis as "an acute infectious disease in the course of which paralysis is but an accidental and incidental occurrence". Aycock estimates that in the worst epidemics 1 person in 500 contracts poliomyelitis; but, if "abortive" and non-paralytic cases are included, it may be one in ten. In other words, there may be fifty mild or subclinical cases to one frank paralytic case. In a recent epidemic in Greenland (1932) Hrolv[1] reported 83 pronounced cases in a total population of 2,263, resulting in 20 deaths. He states that during the epidemic "nearly all the inhabitants complained of headache and indisposition for two or three days, particularly the children, many of whom had headache with moderate constipation and mild fever". It was his belief that these persons were more or less infected without presenting definite symptoms of acute invasion or signs of paralysis. A previous epidemic in Greenland (1914) resulted in

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37 deaths in a population of 700. At that time the outbreak began with an "influenza-like" disease which was so general that the reindeer hunt of the season was a complete failure. Paralysis was observed in some of the hunters after their return home.

In the more recent epidemic in Toronto, during the past summer, in a population of approximately 650,000, there were 747 cases reported, 183 of which exhibited paralytic symptoms, resulting in 30 deaths. Two-thirds of the cases reported were under 10 years of age, and three-fifths were in males. During this epidemic there were doubtless hundreds, and possibly thousands, of subclinical or potential "polio" cases, of the "summer flu" type, that responded to the usual home treatment without medical attention.

With the accruing evidence from repeated epidemics it becomes increasingly obvious that a much smaller proportion of the reported cases actually suffer paralytic involvement, as compared with the earlier history of the disease, when the paralytic cases only were recognized. It would therefore appear that the hypothetical virus of this disease, which has in the past been regarded as specifically neurotropic, is little more selective in its action on the central nervous system than the infectious agents of other diseases, notably diphtheria, malaria and influenza.

Myers[2] reports 1,316 cases of diphtheria with 275 developing paralysis, and 80 deaths, most of the latter being due to cardiac paralysis. Of the paralytic cases, as to age, 104 were under 5 years, 138 were from 5 to 10 years and 33 were above 10 years. There was a marked preponderance of paralysis among the males. The paralysis usually comes on during convalescence. Occasionally, however, it occurs in the early stage of the disease, even on the 2nd or 3rd day. The close parallelism in these figures as to age, sex and paralysis incidence, when compared with the poliomyelitis figures in the recent Toronto epidemic, is most striking.

Zingher,[3] in a report on over one thousand cases of poliomyelitis under 5 years of age, found over 80 per cent to be Schick-positive. Baginsky says: "I have been struck with the very extraordinary sensitivity of children suffering with such diseases of the central nervous system as poliomyelitis, spastic cerebrospinal paralysis, hemiplegia, etc. One is scarcely able to keep these children in the hospital wards free from infection with diphtheria." The situation in this respect at the present time may be somewhat altered owing to the general adoption of toxoid immunization.

In a comparative study of poliomyelitis and diphtheria Jungeblut[4] reports poliocidal substances occasionally demonstrable in the serum of monkeys actively immunized against diphtheria toxin. He and his associates also found that contact *in vitro* with adrenalin, cortin and vitamin C is equally destructive for both the toxin of diphtheria and the virus of poliomyelitis. In a discussion of the predisposition of certain constitutional types to severe forms of diphtheria, Seckel reports six cases with five deaths, two of which patients were previously attacked by poliomyelitis; while Wernstedt reports three cases of poliomyelitis, one fatal, which developed in children within 11 to 19 days after the onset of diphtheria. In reviewing this subject Jungeblut concludes that the data presented "are strongly suggestive of the operation of some common basic mechanism which governs susceptibility and resistance to both poliomyelitis and diphtheria". Obviously there must be some constitutional factor which determines the age and sex incidence and susceptibility to paralysis.

Draper has emphasized the frequency with which certain constitutional types are found in poliomyelitis wards. He notes specially the prevalence of wide interpupillary spaces, high-arched palates, cleft upper incisor teeth, etc., with the inference of a possible endocrine imbalance as an endogenous factor in susceptibility. With reference to this factor he further states: "The highly specialized type of child described above is a causal factor of equal importance with the virus in the occurrence of infantile paralysis; but, so far as development of paralysis is concerned, the constitution of the child is of greater significance than the virus."

On the assumption of possible exogenous factors in susceptibility, based on nutritional imbalance, the recent work of Jungeblut and Toomey is of interest. The former, in experimental poliomyelitis in monkeys, has obtained a fair degree of protective effect from vitmain C when administered within a rather definite range of dosage. The latter has demonstrated increased susceptibility when vitamin D is withheld in conjunction with a diet otherwise rich

in vitamins. But, strange to say, little or no work of a conclusive nature has been done in this respect with the anti-neuritic vitamin B. With the established anti-paralytic effect of vitamin B in beriberi it would seem that this pioneer in the vitamin field should offer the most hope of protective value in poliomyelitis.

Recent reports of successful treatment of many common paralytic conditions by vitamin B give support to this hypothesis. Favourable results have attended the administration of vitamin B concentrates in the treatment of alcoholic polyneuritis,[5] post-diphtheritic paralysis,[6] neuritic paralyses associated with pernicious vomiting of pregnancy (based on the belief that a fetus increases the demands on the mother for vitamin B, while persistent emesis decreases the maternal intake), and the paralyses of diabetes and pernicious anæmia,[7] referable to impoverished diet. Swineford[8] reports paralysis in a prolonged typhoid case, in which administration of vitamin B brought about prompt relief of the neuromuscular symptoms. Vorhaus and his associates[9] report the favourable treatment of 100 cases of neuritis with 10 mg. of crystalline vitamin B daily. Three of their cases which were associated with pregnancy were completely relieved of their neuritic symptoms. Gerstenberger[10] reports remarkably favourable results in the vitamin B treatment of herpes, a neuropathy referable to a neurotropic virus and classified pathologically as a posterior poliomyelitis. Hoobler[11] reports a favourable response to vitamin B therapy in a number of cases of toxæmia in infants associated with muscular rigidity. Gruenfelder and his associates[12] interpreted a form of infantile toxæmia occurring in Jerusalem in the hot weather as a form of vitamin B deficiency, and obtained surprisingly good results with vitamin B concentrates intravenously.

In a comparative study of poliomyelitis and beriberi many features common to both diseases provide a striking similarity. In poliomyelitis mostly infants and juveniles are attacked, with a noticeable predilection for males, while beriberi has its greatest incidence in infancy and in young adult males. Poliomyelitis has its peak of incidence in the hot weather—July, August and September in northern temperate climates—and the corresponding summer months in southern temperate climates; while beriberi prevails in tropical climates where the weather is warm almost constantly. Both diseases are predominantly characterized by flaccid paralysis of the leg muscles, with ascending and bulbar varieties involving the cranial nerves, and with very similar neuropathology. Gastro-intestinal disturbances and muscle tenderness are characteristic of both diseases, œdema is pathologically common to both, and physical over-exertion is a well recognized predisposing factor in both.

A striking illustration of the possible basic relationship of poliomyelitis and beriberi is provided in the epidemiological history of Nauru, a small volcanic island in the southern Pacific ocean. Previous to the Great War this little island of eight square miles area was a German colonial possession, but has been under mandate to Australia since 1919. The population in 1910 consisted of 1,250 native Nauruans, about 500 natives of the neighbouring Carolines, about 500 Chinese, and 80 Europeans. The last three groups were all employees of a phosphate mining company, the sole industry of the island.

In 1905-6 the German colonial physician reported a number of cases of "infectious polyneuritis" on the island, followed in 1910 by what is regarded as the most intensive epidemic of poliomyelitis on record. Within 14 days some 700 cases developed, resulting in 38 deaths. The greatest incidence of the disease was among the native Nauruans, with 470 cases and 37 deaths. There were 220 cases with one death among the Carolinese phosphate workers, these all being treated in the company's hospital. The Chinese were completely exempt, and among the Europeans there were only three mild cases. The onset of all cases was with fever and chills followed by digestive disturbances, constipation and sensation of pressure or fullness of the stomach (a symptom common in beriberi, due to gastric atony). Vomiting, diarrhœa and headache were also common. Pain in the back of the neck, lumbar region and legs was often noted, all the muscles being very sensitive to pressure. Paræsthesia and paralysis developed in most cases, usually disappearing during convalescence, although at the end of three months there were some 50 cases of pronounced residual paralysis. Œdema of the legs below the knees was noted in a number of cases (suggestive of wet beriberi). In most of the fatal cases respiratory paralysis developed. Diplopia was noted in two cases and œsophageal paralysis in one case. The pulse rate, compared to the fever, was noticeably accelerated (a feature common to beriberi).

The age-incidence of the epidemic was somewhat unusual for poliomyelitis, most cases being within the limit of 12 to 40 years. The old people were completely exempt, as were most of the young children, in spite of constant contacts. Three nursing infants were afflicted along with their mothers (such cases are rarely noted in poliomyelitis, but not uncommon in beriberi).

A striking feature as to incidence was the fact that among the Carolinese workers of the phosphate company nearly all the severe paralyses occurred in a group that came from the island of Singelap, although they constituted but 15 per cent of the Carolinese workers. A noticeable constitutional characteristic of these, as in the Nauruans, was a "spongy fattiness" (suggestive of general cellular œdema, indicative of a beriberi background).

The transmission of the disease to the island could not be established. Vessels from Australia, which had been 11 days in transit, had no cases on board; and steamers from Hong Kong, nearly three weeks en route, had no cases, and neither was there any similar disease

at ports of call. Natives arriving by these steamers were and remained healthy through the entire epidemic.

Owing to the unusual epidemiological features of this outbreak the local colonial physician, Dr. A. Müller, was hesitant in identifying the disease as poliomyelitis. Aside from the neuromuscular phenomena he regarded the epidemic as typical of influenza, especially the rapid spread and almost simultaneous incidence of the cases. However, some years later many of the victims of this epidemic were very carefully examined and found to have residual paralyses and deformities characteristic of poliomyelitis, and at the present time the identity of the disease is generally regarded as established.

In October, 1920, the post-war pandemic of pneumonic influenza swept the island, with an incidence of 100 per cent and a mortality rate of 30 per cent. In the trail of this holocaust ill health and debility were everywhere manifest, a condition which was apparently aggravated by an obvious dietary deficiency. To make matters worse, leprosy broke out and spread so rapidly in spite of the usual precautionary measures that by 1925 fully one-third of the population exhibited clinical signs of the disease.

In 1926 Dr. G. W. Bray, the new medical officer of health under the Australian régime, who had noticed that for a number of years previously the native infant mortality under one year of age had been almost 50 per cent of the total births, made an investigation of the dietetic habits of the natives in an effort to remedy the situation. Previous to this time the sale of polished rice had been forbidden, and the use of fermented "toddy", made from the sap of the cocoanut tree, had also been interdicted, but no restriction was placed on the consumption of sugar, white flour and canned meats, all of which were void of vitamin B. Dr. Bray had noticed that most of the infant mortality had occurred in breast-fed babies during the third month from birth, and that this condition did not apply to infants separated from their leprous mothers and fed artificially by relatives. Most of these infant deaths had been recorded as due to "stomach trouble", "infantile diarrhœa", "convulsions", "marasmus" and "broncho-pneumonia", but Dr. Bray concluded from a careful analysis of the situation that the basic ailment was infantile beriberi, similar to the type so often seen in Japan and the Philippines. Accordingly, samples of the mothers' milk were tested chemically and biologically. The protein and fat were found to be low and the sugar high, due perhaps to the habitual use of sugar-water by the native women as a beverage. Samples of the milk fed to chickens produced typical polyneuritis in about three weeks, which was readily cured by feeding yeast. Based on the obvious assumption of a vitamin B deficiency, a radical change in the native dietary was instituted. The sale of white flour and polished rice was forbidden in the native stores, whole-meal flour and brown rice being substituted, and the use of whole wheat bread was encouraged. Sweet potatoes were introduced, and the value of eggs and condensed milk was stressed. The sale of sugar was restricted to 1 lb. per adult per week. The use of the yeast-laden cocoanut-sap beverage was again permitted, and the sick babies were treated with an emulsion of the yeast in cod-liver oil. As a result of these measures the infant death rate rapidly fell from 50 to 7 per cent, at which level it has consistently remained. Not only has there been no further reported occurrence of "poliomyelitis" or infantile beriberi, but even leprosy and tuberculosis, which were rife on the island, have been almost completely eradicated. This is in harmony with the observation of Takaki, that whenever beriberi was reduced in the Japanese navy the health of the men improved generally and other diseases decreased.

The most obviously logical conclusion from the above narrative is that vitamin B deficiency furnished the basic background for most of the neuropathological conditions of this unfortunate island. It, perhaps, may have accounted for the unprecedented high rate of incidence of the 1910 epidemic of "poliomyelitis", and may have contributed to the unusually high mortality of the 1920 epidemic of influenza—a disease also noted for its effect on the nervous system. It was probably also the chief etiological factor in the "infectious polyneuritis" of 1905-6.

On the assumption of B hypovitaminosis as common to poliomyelitis and beriberi the deficiency may conceivably be precipitated in the former as a sequel to the acute infectious invasion, in which the febrile state, by greatly increasing the metabolic demand for the vitamin, brings about a rapid depletion of its storage in the tissues; whereas in the latter the vitamin deficiency is generally of slow and insidious onset as a result of long continued dietetic error and prolonged action of predisposing factors. Under these conditions it is quite conceivable that the degree of destructive action on the central nervous system might be materially different, the protective responses of the organism having more time to act in beriberi than in acute poliomyelitis. There are not a few instances, however, in which a febrile infectious invasion has precipitated beriberi. Bentley[13] reports 52 cases of beriberi in which 28 appear to have been the sequel of recurring malaria or dysentery and allied conditions. Three cases of beriberi following relapsing fever are reported by Yacoub, associated with prolonged feeding on condensed milk, a food containing a scant amount of vitamin B. In Brazil beriberi is so frequently associated with a preliminary febrile condition, of an influenza-like nature, that clinicians in that country still regard the disease as basically infectious.

There are a number of determining factors in relation to the vitamin B requirement of the organism which have a direct bearing on the question of its possible deficiency in poliomyelitis. In the first place it has been shown by Gaynor and Dennett[14] that the storage of vitamin B in the tissues of young children is very limited, excess supplies of the vitamin being quickly exhausted from the system. Hendricks[15] and Cowgill[16] have shown that the vitamin B requirement bears a direct relation to the metabolic rate. According to DuBois, with increased physical exertion and in all febrile states there is a marked increase in the metabolic rate. Accordingly, under these conditions there would be a corresponding depletion of the tissue storage of vitamin B. In fevers associated with gastro-

intestinal disturbances, such as in beriberi and poliomyelitis, the depletion of the anti-neuritic vitamin is not only thereby hastened but the ingestion and assimilation of new supplies is cut off. The metabolic rate has its highest peak at the period of most rapid growth and activity, in childhood, declining gradually with maturity and advancing age. The metabolic rate is also higher in the male. It is, therefore, perhaps not without significance that the age and sex ratios of the metabolic rate, and consequently the corresponding ratio of the vitamin B requirement, bear an almost parallel relationship to the age and sex incidence of paralysis in poliomyelitis, diphtheria and beriberi. The seasonal influence of gastro-intestinal disturbances in children, such as "summer flu", "stomach flu" and "summer complaint", with their depleting effect on vitamin B tissue storage, may also be a contributing factor in the seasonal incidence of poliomyelitis. Another factor related to vitamin B demand and seasonal incidence may be the marked increase in growth and physical activity of children during the school holidays in the summer months. Prof. W. T. Porter, of Harvard University, found in the observation of 3,000 school children that the seasonal period of greatest growth and weight increase was during the summer and early fall.

In view of all these factors contributing to vitamin B depletion it seems not unreasonable to conclude that an acute deficiency of this essential anti-neuritic element may so condition the nervous system that the infectious agent of poliomyelitis may more readily effect destructive action resulting in paralysis.

An interesting sidelight in this connection is the reported observation of concurrent epidemics of paralytic diseases in domestic animals, notably dog "distemper" and encephalomyelitis in horses, sheep and cattle. It is not, perhaps, merely coincidental that these animal diseases, which exhibit pathological changes in the central nervous system almost identical with poliomyelitis in man, also have relatively the same age, sex and seasonal incidence. Even the ancient Greeks and Romans recognized the seasonal incidence of disease, notably during the "dog days" (dies caniculares) in July and August, associated with the influence of Sirius the dog star. Hesiod tells us that "Sirius parches head and knees" (typical of poliomyelitis). Homer speaks similarly, calling it the evil star, the star of late summer. The pestilences which then prevailed occasioned the offering of sacrifices to placate the inimical star.

On the basis of the deficiency hypothesis advanced herein many of the hitherto unexplained features of poliomyelitis may be somewhat clarified. Aside from the age, sex and seasonal incidence, which seem definitely related to the metabolic demand for vitamin B, it would account for the spotty and relatively small incidence of paralytic symptoms, the conspicuously noticeable lack of contagious relationship between such cases, and the recognized ineffectual control by quarantine. Davison[11] says: "Isolation for three weeks of patients and contacts is required by most boards of health since 1916, but the evidence then and now does not indicate that anything is accomplished by this procedure . . . The disease rarely attacks more than one member of a family, and cases developed from contact are conspicuously rare. Of 2,070 persons definitely exposed only 14 contracted the disease . . . patients with the non-paralytic or subclinical type of the disease must be so common that nearly the whole population should be isolated."

In the last quarter century there has been a gradual advance in the age line in poliomyelitis. The cases under five years, in New York City, in 1907, were 86.8 per cent; in 1916, 79.2 per cent; in 1931, 53.3 per cent; in 1935, 32.8 per cent. In Philadelphia the cases under five years were, in 1916, 71.1 per cent; in 1932, 51.5 per cent. A similar advance has been noted in the Toronto epidemics. Improved infant hygiene, particularly the adaptation of the newer knowledge of the vitamins to the dietetics of infancy and childhood, has significantly paralleled this advance in the age line.

In recent years considerable prominence has been given in both the medical and commercial world to the importance of the vitamins, particularly the A, C and D varieties, as reflected in the increased use of fish-liver oils and citrous fruits, irradiation of food products, and exposure of the body to ultra-violet lamps and sunlight; but vitamin B seems to have been left in the background. The infant and young child of today are amply supplied with vitamins A, C and D in the form of cod-liver oil, orange and tomato juice. A scant supply of vitamin B is supplied in both human and cow's milk; but no routine measures are employed to contravene vitamin B deficiency in the diet of young children at a time when rapid growth makes increased demands for this essential food element. McCollum points out that there is very clear evidence that nutritive disorders

have a far-reaching influence in controlling the health of children, bringing about many border-line cases of malnutrition. He emphasizes the danger to health in adherence to a diet in which milled cereal products, particularly white bread, and sugar, syrup, tubers and meat of the muscle type predominate (all deficient in vitamin B). Williams says: "The discovery of the vitamins has entirely altered our conceptions of the causes and origins of disease. Until lately disease was regarded as a sin of commission by some unseen and subtle agency. The vitamins are teaching us to regard it, in some degree at any rate, as a sin of omission on the part of civilized or hypercivilized man. By our habit of riveting our attention on microbes and their toxins we had sadly neglected the side of the question which concerns itself with our own defences."

SUMMARY AND CONCLUSIONS

An attempt has been made to interpret the incidence of paralysis in poliomyelitis as referable in some degree to an acute deficiency of vitamin B. This, it is thought, may be brought about, in border-line cases of hypovitaminosis, by age, sex and seasonal factors determining an increase in the metabolic demands for the said vitamin, combined with the precipitating, vitamin-depleting influence of an acute systemic invasion by an infectious agent of known neurotropic properties. No experimental or clinical data are submitted in support of the theory advanced, but, if its basis is physiologically sound, it would appear that a fair clinical trial should be given to this natural nerve-protective agency which has proved to be so effectual in the treatment of other paralytic conditions of undoubted similarity. The use of this simple remedial agency would not be fraught with any of the dangers which have attended the use of serological and chemical agencies.

It is expected that the most hopeful application of the theory advanced should be in prophylaxis and during convalescence, rather than in the acute invasional stage of the disease, since the onset is so rapid that neuromuscular damage often occurs before the disease is recognized.

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PRURITUS ANI*

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PRURITUS ani may be defined as an irritative condition of the skin in the peri-anal region. Numerous causes have been suggested as the etiological factors and several classifications of the condition have been offered. I should like to submit the following practical classification of three groups.

Group one: in which there is no gross or microscopic change in the peri-anal skin, *i.e.*, in which itching is the only symptom. The common *direct* causes of this variety are: (1) lack of cleanliness; (2) certain types of underwear; (3) the presence of an irritable discharge from the rectum; (4) idiosyncrasies to certain foods; (5) parasites. The *indirect* causes are those referred from infection of the prostate (urethra), vagina, cervix, and, rarely, from a lower abdominal viscus, and neurosis. This group makes up about 5 per cent of all cases.

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Group two: in which there are gross and microscopic changes in the peri-anal skin, and in which other skin lesions are present. This group would include such conditions as epidermophyton, in which the skin of the ischio-rectal fossæ, buttocks, groins, hands, feet, and possibly the lower half of the face, are affected.

Group three: in which the peri-anal skin alone shows changes. This group makes up over 90 per cent of the cases.

TREATMENT

The treatment of the first group is removal of the cause, for example, by change of underwear, correction of the diet, etc. The treatment of the second group belongs to the dermatologist.

The treatment of the third group is the one I wish to speak of particularly here. That this condition lends itself most stubbornly to treatment is shown by the innumerable remedies offered for its relief. In the belief that this is purely a skin lesion a countless number of ointments have been tried, with no permanent result. X-rays, ultra-violet rays, quartz light and radium have been tried by those skilled in their application, but the relief has only been temporary.

While no one knows the real cause of this type of pruritus ani, I am convinced that it lies in the sensory nerve fibres of this part of the skin. It would seem that any procedure which would bring about a permanent degeneration of these fibres without destroying the motor fibres would be the logical one. The operation devised by Sir Charles Ball is based upon this principle, but, unfortunately is attended with the return of symptoms in about 50 per cent of cases.

Subcutaneous injections of solutions in oil of various cocaine derivatives: nupercaine, procaine and A.B.A. solution, in the hope that their effects would be prolonged, have met with varied results. Claimed cures vary from 20 to 50 per cent. My own experience is that a small percentage, 20 to 25, shows a permanent cure. In the great majority of instances the treatment must be repeated, and repetition does not ensure permanent cure. Any form of treatment which is not recompensed by at least a 75 per cent cure should not be considered successful.

In the past two years I have been using a method first introduced by Stone, and since modified by Buie. It consists of a subcutaneous injection of a 40 per cent solution of ethyl alcohol beneath the affected area. A long flexible needle is used. My personal preference is for a Labatt needle about four inches in length and 20-22 gauge. Between 20 and 40 c.c. are used. Under spinal anæsthesia the needle is introduced into the coccygeal region and carefully pressed to a point just short of the bulbus urethræ, or perineal body. The solution is injected evenly so as to iron out the folds as the needle is gradually withdrawn. The opposite side is injected likewise, without making a fresh puncture if possible. Complete anæsthesia is established at once.

I know of no surgical procedure which requires more post-operative care. The injected part must be kept as clean and dry as possible. Warm saline baths are instituted the day after injection, and carried out every four hours, the skin dried and painted with an antiseptic solution such as metaphen. This procedure must be carried out for about two weeks, during which time the patient must be in hospital. The danger period is from the tenth to the twelfth day, *i.e.*, when other surgical cases are well on to recovery. One of the dangers of this method of treatment is sloughing and abscess formation. A little sloughing is not an undesirable feature. I may say that careful supervision during the post-injection period will reduce the occurrence of this complication. I would frankly state that this complication rarely occurs in my cases.

I have met with only one total disappointment. One other case has not been completely cured, but relief has been so marked that further treatment is not necessary. In only one case has sloughing caused me any concern, but this patient has been completely cured. Small isolated areas of sloughing have occurred in about 12 of my cases, but this was of a minor nature and of no consequence. Most of cases in which sloughing has occurred were associated with the development of small abscesses. In this series, one patient had had syphilis and had successfully undergone specific treatment. I do not regard syphilis as a causative factor of this condition.

DISCUSSION

DR. C. K. P. HENRY.—Dr. Danis has just spoken to us on a subject of widespread interest, as pruritus ani is a condition which affects young, old, male and female, rich and poor. To discuss this one should have a proper conception of its frequency, its etiology, and the possible methods of treatment.

It is apparent that Dr. Danis has had an unusual number of cases for treatment. In the Montreal General

Hospital, which is composed of public, semi-private and private beds to the total number of 600, I have searched the indexes of diseases, primary, associated and complicating conditions, in the central division (largely public) and in the western division (largely private) and I was surprised at the small number of cases recorded in both divisions, with the exception of the department of gynæcology, where such cases have been taken up by Dr. A. D. Campbell, chief of this division, and Dr. B. Usher, of the dermatological department. During the six-year period, 1931 to 1935, a total number of 51,257 cases were admitted (not including gynæcological patients). In the index under "pruritus ani" 17 cases were listed, or less than 1 in every 3,000! It may interest you to know that of these 17 there were 8 females and 9 males; 3 were very obese and 6 had either diabetes or altered sugar tolerance. Ten patients were admitted to Surgery, 6 to Medicine and 1 to Neurology. Nine of the 17 had hæmorrhoids, anal fissure or rectal polyp, and the pruritus ani was considered to be secondary to these conditions. Seven were operated on. Five cases showed marked changes in the peri-anal skin. In 6 of the 17 cases no definite cause for the pruritus ani, other than general conditions, diabetes, anxiety state, obesity, etc., was established. This showing must indicate that in the northern climate of Montreal we have fewer cases, or fewer cases are admitted to hospital, or we do not record this diagnosis in all cases!

As regards etiology, in the cases above studied and in my own cases I am struck with the large number of patients who are obese, and that they nearly all had some rectal condition which frequently appeared to be the etiological factor. From the standpoint of a surgeon, I believe that in every case proctoscopic examination should be made, and that hæmorrhoids, fistulæ, tags, polyps, etc., should be treated. For many years, in cases of marked dermatological changes, I have undercut the skin widely, as is done in Little's operation, by puncture at two or four points, and have had very satisfactory results therefrom.

Dr. Danis' method appears in his hands to give a very high percentage of cures, but, obviously, it will impress most of us with its time-consuming convalescence, and the occasional sloughing of the skin, though Dr. Danis himself has not encountered this. By dissecting out the pudendal and other cutaneous branches an equally complete cure may be expected, without the objections I have just mentioned. Necessarily, any operative treatment must be combined with post-operative cleanliness, hygiene, and often with some form of mental treatment; underlying factors, as obesity, diabetes, etc., must also be treated. Dr. Danis has presented a very timely subject for discussion. Alcohol injection has been efficacious for painful areas in tic douloureux, in intra-oral cancers, in intercostal and paravertebral injections, and its use is well authenticated, especially to precede more radical surgical treatment. Dr. Danis' method is to be classed with these other successful methods.

Case Reports

A CASE OF UNILATERAL INTRAPELVIC PROTRUSION OF THE ACETABULUM SO-CALLED ARTHROKATADYSIS

By W. H. WARDELL, M.D.

Moose Jaw, Sask.

Mrs. C.E., a frail woman, aged 56, married, two children grown up, weight 85 to 90 pounds.

I was called to see her on December 1, 1936, she being confined to bed, complaining of pain in the lower limbs, especially in the left hip joint. The left leg appeared somewhat shorter than the right. There was nothing unusual in the outward appearance of the hip. The right knee joint was arthritic. Her personal history was negative except for a progressively severe rheumatoid arthritis extending over a period of twelve years, with hands so deformed and painful as to be practically useless.

During the early months of 1936 she noticed vague symptoms of discomfort in the left hip. About the third week in August she fell on her left side while riding an escalator in a store in Vancouver. She was quite upset for some time by this, but with care from attendants in the store was able to walk out. After returning home to Moose Jaw the symptoms gradually became more aggravated in the hip, and about November she was unable to walk except with difficulty.

In the examination, pain prohibited any extensive manipulation of the hip joint. The attention was riveted on this and little notice was taken of the right knee, which was arthritic, the right limb being called upon to favour the left. I therefore advised an x-ray examination.

I am indebted to Dr. R. Michaud, Roentgenologist at the General Hospital, Moose Jaw, for an x-ray diagnosis, and also for some literature he had on hand, by Levinthal and Wolin,[1] both orthopædic surgeons of Chicago, and in which they give a brief review of the literature and comment on the etiology and pathology.

I cannot do better than quote in part from their article.

"This imposing name, meaning 'subsidence or sinking-in of a joint,' was suggested by P. J. Verrall,[2] of London, in 1929 for a peculiar condition of the pelvis which was first described by Otto in 1824. The characteristic feature is an intrapelvic protrusion of the acetabulum and the head of the femur. . . .

"The condition is characterized by a protrusion of the acetabulum into the pelvis and a narrowing of the joint space. This is apparently the end-result of a localized destructive process in the hip joint affecting essentially the acetabulum, resulting in softening and thinning of its wall. The deformity is evidently the result of weight-bearing and muscle pressure; the



Fig. 1

femoral head, pressing against the weakened acetabular floor, literally bores its way into the pelvis. The great trochanter approaches, and finally may impinge against the ilium, while the lessor trochanter comes closer toward the ischium. The hip joint is thus markedly deepened, its motion restricted, and the extremity shortened. . . .

"This is not a specific disease. The etiological factors in the cases reported in the literature have been quite variable, including osteo-arthritis, gout, gonorrhœa, syphilis, tuberculosis, trauma and endocrine disturbances. In a personal communication Mercer tells us that he believes the case he described was due to toxins of the tubercle bacillus, *i.e.*, Poncet's disease. Pomeranz[3] suggests that it may be an atypical but essentially non-specific arthritis of the hip joint. Schaap[4] believes that some of these cases may be ascribed to a congenital anomaly in which the acetabular cavity is too deep."

All of Levinthal and Wolin's 5 cases were treated conservatively except one, with a choice between diathermy, radiant heat, massage, traction, salicylates, plaster casts, braces, etc., with no improvement in some and apparent improvement in others. In the one case an arthroplasty was done with marked benefit after failure of conservative treatment.

I am indebted to Dr. M. N. Smith-Petersen, Chief of the Orthopædic Service in the Massachusetts General Hospital, Boston, for helpful suggestions in procedure in a personal communication. I also have his report of a case.[5] This report occasions no little surprise to one initiated for the first time into an acquaintance with these cases. One may infer that this is the first and probably the only one so far which has passed through that large hospital. He says:

"In February, 1935, a patient, aged 55, was admitted to the orthopædic ward of the Massachusetts General Hospital, with a diagnosis of bilateral intrapelvic protrusion of the acetabulum. The case was discussed on the ward rounds, and the general opinion was that nothing could be done for this patient and that she would have to adapt her life to the hip joint condition. This did not seem a constructive attitude and the patient was allowed to stay in the ward in the hope that some operative procedure might be developed which would give her relief from pain. The question was, what is the source of this patient's pain? The answer was—impingement of the femoral neck on the acetabular margin."

After further discussion, he goes on to say:

"The patient was informed that the operation had never been performed before, but that it did offer a chance of success; she accepted the operation willingly. In four weeks she left the hospital walking and in four months she returned to her work as a housekeeper."

The report has nothing to say about conservative treatment, evidently not considered worthy of consideration from the outset.

An operation is devised and detailed whereby the hip joint is approached through a fairly long incision along the anterior third of the crest of the ilium and obliquely downward following the lateral border of the sartorius muscle, then finding one's way down between muscles without disturbing their relation except by retraction and the temporary severing of the direct head of the rectus femoris one comes on to the acetabulum and joint capsule. The technique here was quite suitable for our case, entitled "acetabuloplasty".

We removed a quarter to three-eighths of an inch from the upper and anterior bony rim of the acetabulum down to the notch, and with it all the anterior portion of the capsule and synovial membrane, including its distal insertion. By manipulating the limb we were able to demonstrate a healthy condition of the cartilage over the head of the femur, with a fairly sure inference for the same condition in the socket. There were no exostoses.

The patient was operated on on April 2, 1937, made a good recovery, with primary union of the wound. The pain in the joint was eliminated, and so far (October 20th) there has been no return of it. Hospitalization was twenty-one days following operation.

On April 19th re-examination by x-ray showed no change in the position of the head of the femur. Long range passive motion of the limb could now be made without pain.

Our patient was absolutely confined to bed for four months previous to operation, without any improvement. Movement of the limb, however small, caused pain, and this, with the prospect of having to put up with it for the rest of her life, helped her in the decision to take the risk of operation.

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4. SCHAAP, C.: Intrapelvic protrusion of acetabulum, *J. Bone & Joint Surg.*, 1934, 16: 811.
5. SMITH-PETERSEN, M. N.: Treatment of malum coxæ senilis, old slipped upper femoral epiphysis, intrapelvic protusion of acetabulum, and coxa plana by means of acetabuloplasty, *J. Bone & Joint Surg.*, 1936, 18: 869.

MIGRAINE.—A. Schick reports the results of treating seventy-four cases of migraine with magnesium sulphate. A course of about twelve intravenous injections of a 50 per cent solution of magnesium sulphate was given. The first two injections consisted of 2 c.c. of the solution, and subsequently this was raised to 5 c.c. The injection has to be given very slowly, preferably with the patient lying on his back. Out of the seventy-four cases treated forty-five obtained relief, four cases were cured altogether, while the remaining twenty-five were uninfluenced. The treatment proved harmless and was well tolerated in every case.—*Wien. klin. Wschr.*, August 20, 1937, p. 1205.

Therapeutics and Pharmacology

LOCAL ANÆSTHESIA FOR COLLES' FRACTURE

By C. C. Ross, M.D., F.R.C.S.(Edin.)

London, Ont.

A Colles is the most frequent form of fracture, with the exception of that occurring in the clavicle. Though it seldom causes loss of life yet frequently patients are left with a partial permanent disability due, it must be admitted, in most cases, to error in treatment. Since Abraham Colles first described the condition in 1814 our methods of treatment have gradually improved. One of the most recent is the use of local anæsthesia. Although this was advocated years ago it is really only since the outstanding work of Bohler, of Vienna, that the method has gained in popularity. In most of the large centres in Canada it is today the method of choice, although there are many practitioners who have not as yet adopted it.

To the writer this method offers the following distinct advantages— (1) only one medical man is required; (2) It obviates the dangers and discomforts of general anæsthesia; in elderly people or in persons who have recently had a great deal to eat or drink this is an important consideration; (3) there is no need for hospitalization or loss of time from work, as there frequently is with general anæsthesia; (4) many people fear general anæsthesia.

The disadvantages are— (1) the danger of infection; this with proper technique ought not to occur; (2) incomplete anæsthesia; this suggests, nearly always, an error in the application of the method.

The technique is as follows.

1. The lower third of the forearm and wrist is carefully prepared with iodine and alcohol.

2. With a hypodermic syringe one or two c.c. of 2 per cent novocaine are introduced into the skin and subcutaneous tissues over the posterior surface of the radius, a little above the site of fracture. If the styloid process of the ulna is fractured novocaine should also be injected in this area.

3. With a 22 gauge needle 1¼ inch in length attached to a syringe 20 c.c. of 2 per cent novocaine are introduced between the fragments of the fractured radius. This is best accomplished by inserting the needle downwards and forwards at an angle of approximately 45 degrees to the plane of the forearm. Usually the needle can be felt to enter between the fragments. To make certain of this, however, the plunger of the syringe should be withdrawn slightly, with the aspiration of blood. This confirms the position of the point of the needle, and anæsthesia will not be satisfactory unless the solution is between the ends of the bone.

4. The needle is withdrawn, alcohol is applied to the puncture wound and a collodion or sterile dressing applied.

5. Twelve to fifteen minutes should elapse between the time of injection and the manipulation necessary for accurate reduction.

6. Reduction is carried out and plaster in the form of an anterior and posterior moulded slab is applied.

Routine treatment follows the reduction. The writer is able to recommend this method most highly.

VARICOSE ULCERS AND INSULIN

By L. G. Payne

Dresden, Ont.

Among the more common ailments met with in general practice varicose ulcers occupy no insignificant place, and the treatment, in their case, seems to be the all important angle for consideration.

Besides the several age-old measures used for their cure, such as rest, which, for the varicose ulcer means elevation of the leg, antiseptic powders and solutions, ointments of various kinds, and occlusion of adjacent veins, local treatment with insulin, has, I think, a very definite value. This treatment consists in applying to an ulcer cleansed with saline compresses and dried a small amount of insulin (usually U 20 strength) for approximately ten minutes. Following this, the insulin which has not been absorbed is removed, the base of the ulcer dried again, and the dressing, or elastic adhesive, applied. This, with elevation of the leg, will in many cases effect a cure even of large ulcers, within two or three weeks if the dressing is done every three or four days.

In those persons of younger age, or where the ulcer has a deep margin and fibrosed base, or in those for whom rest is less easily obtained, the insulin treatment seems less satisfactory, and in these seldom does anything short of injection or ligation of the regional veins suffice.

In the class of case where the ulcer is shallow, the patient older, or where rest with elevation of the leg is possible, the best results with insulin are obtained; the bluish epithelial margin quite often closes in a quarter of an inch on all sides per week, once the ulcer base has become healthy.

I have found that for the initial treatment, where the ulcer is almost invariably infected, a dressing of iodine dusting powder covered by elastic adhesive for three days is very satisfactory.

To conclude, it may be said that the above treatment with insulin is entirely empirical, the rationale unknown, but in those cases in which I have used it a marked improvement seems to have resulted.

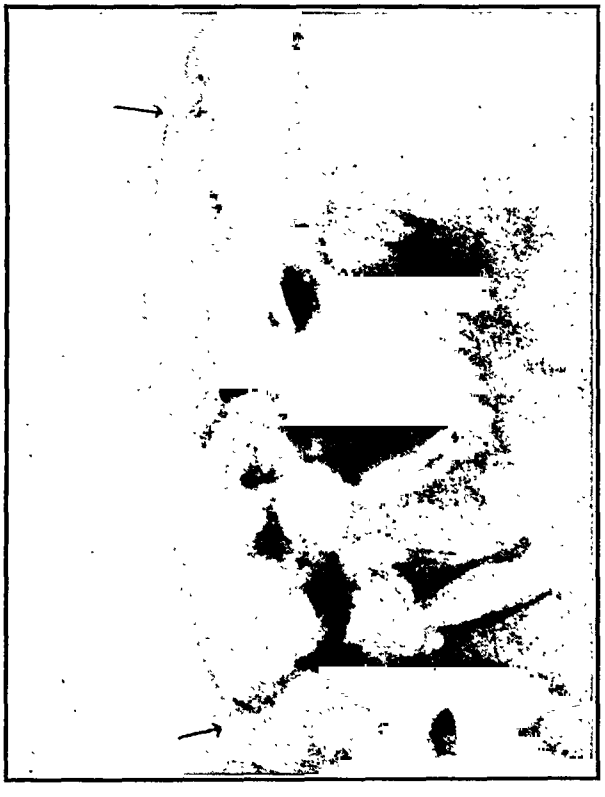
Clinical and Laboratory Notes

AN ALBEE OPERATION AFTER 20 YEARS

By J. A. Nutter, M.D.

Montreal

In 1917 a young woman, I.L., aged 27, was operated upon for Pott's disease of the 12th dorsal and 1st lumbar vertebræ. The diagnosis was confirmed by x-rays which showed a destructive process and well marked kyphosis. A bone graft taken from the tibia was used in carrying out the Albee operation, and the result was entirely satisfactory.



An x-ray plate taken in Toronto by the Gage Institute exactly 20 years after the operation is shown herewith. The bone graft appears very clearly indicated in the plate. The patient has remained perfectly well. She has married and has had a child, which was delivered by Cæsarean section.

The original operation was performed by the writer at the Montreal General Hospital, and the plate was sent him by Dr. R. I. Harris, of Toronto, who has recently seen the patient.

PNEUMONIA AS A CONTAGIOUS DISEASE

By Herbert Johnston

Montreal

Although isolation orders are routine in pneumonia, too seldom is it brought forcefully to our attention that we are dealing with an infectious disease. Only too often the history cannot state the exact point of exposure of the patient to the dangerous and contagious coughs of a carrier or of another case. The following notes show how six people developed lobar pneumonia by personal contact with infective persons.

(M.G.H., 7066-37) Mr. H.S., aged 32 a postman, developed chills with shaking and went to bed on December 10th. That night he had cough without expectoration, pain in the left chest on inspiration, and headache. These symptoms continued until December 12th, when he came to the Montreal General Hospital with pneumonia, which was found to be type I.

This man's wife, aged 28, who had had some degree of bronchitis since 1931, was kept awake most of the night of December 12th with a loose hacking cough with much purulent expectoration, but it was not until December 16th, a full six days after the onset of her husband's pneumonia, that she developed the signs of the onset of pneumonia, and when admitted to the Montreal General Hospital on December 21st it was found that she had type I lobar pneumonia. It is gathered from this that his wife developed the same type of pneumonia from contact with him.

The second story of the contagiousness of pneumonia is as follows. A mother (Mrs. W.K.) and her four small children all developed severe colds with coughs. Of these the mother and two children were sent to hospital with what turned out to be type I lobar pneumonia. Because the mother and two of the children were at the hospital a youth of 18 years was brought in as guardian of the two remaining children. This young man slept in a bed only that day occupied by one of the pneumonia patients and in the same room with the two remaining children who continued to cough frequently. The following day this youth developed the signs of

From the Medical Service of the Montreal General Hospital, by permission of Drs. Gordon, Montgomery and Ross.

pneumonia, and when admitted to the Montreal General Hospital it was found that he also had type I pneumonia.

We have, then, the story of how six cases of pneumonia developed by close personal contact among people similarly infected with the type I organism. This leaves little to the imagination as to the contagiousness of pneumonia.

Editorial

THE SURGICAL TREATMENT OF CORONARY OBSTRUCTION

CORONARY obstruction, either partial or complete, is a relatively common disorder. Its initial treatment is in the main palliative, being directed towards relieving pain and combating shock. After the first few days our endeavour is to prevent extension of the process and cardiac decompensation. Coronary obstruction is, of course, referable in the final analysis to certain disorders of the blood and circulation, for example, toxæmia and high blood pressure, either, or both. Structural changes in the coronary arteries develop and their lumen is eventually encroached upon. Finally, as an end-result, from starvation, the heart muscle deteriorates. If the circulation in the coronary arteries is impeded gradually the changes in the myocardium arise insidiously and are generalized—disseminated fibrosis; if suddenly, as from thrombosis and complete obstruction, they are circumscribed—infarction, with myomalacia, fibrosis, or, occasionally, mural aneurysm.

Where we have a history of one or more coronary accidents it is natural to canvas the situation in the hope of maintaining an efficient circulation in the myocardium and so preventing trouble later on. This desideratum may be achieved, up to a point, by drugs and rest, but where these measures have done their best it becomes pertinent to enquire if some other line of treatment, in particular surgical intervention, may not be justifiable.

We used to be taught that the coronary arteries are "end-arteries", that is, that anastomoses between them are practically absent. This notion is quite incorrect. The work of the late Louis Gross, Spalteholz, and others has proved that the heart muscle is provided with a collateral circulation that is far from inefficient. It is nevertheless true that this circulation may prove inadequate when it is suddenly and grossly interfered with, as when the main trunk or a major branch of a coronary artery becomes occluded.

The ordinary blood supply to the heart is provided by the coronary arteries, the thebesian vessels, and certain extra-cardiac anastomoses between the coronaries and the vessels in the fatty and connective tissues at the base of the heart. The anastomoses just mentioned are probably, under normal conditions, of relatively little importance, but in case of need, and given sufficient time, can develop new communications with the coronary arteries and other branches of the aorta, including the internal mammary, pericardial, phrenic, intercostal and œsophageal. It is worthy of note, too, that as people get older these various anastomoses tend to become more numerous and effective, so that in that proportion coronary occlusion, should it occur, is likely to be less damaging. Another observation, important in this connection, is that when adhesions form between the two layers of the pericardium blood vessels can be demonstrated in them[1].

In the light of these facts surgical intervention in cases of coronary occlusion, for the purpose of establishing an additional collateral circulation, would seem to be logical. And, as a matter of fact, during the last two or three years some promising work has been done in this direction. The initial inspiration came from a remarkable observation of Thorel's,[2] who reported a case in which complete occlusion of both major coronaries of long-standing was found post-mortem, the situation apparently having been saved by the occurrence of complete

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concretion of the two layers of the pericardium. The work of Klose (1922), Moritz (1932), Leriche (1932-1934) and Lezius (1937) was also stimulating.

Beck started his investigations in 1932, and Beck and Tichy,[3] working on dogs, found that after they had brought about by certain mechanical means adhesion between the two layers of the pericardial sac they could in some cases, by ligation of both coronary arteries, induce complete occlusion without causing death. Subsequently Beck operated on several human beings with some success[4].

O'Shaughnessy,[5] in England, working with cats and greyhounds to the same end, used a graft of a pedicle of omentum brought through the diaphragm. He first ligated the descending branch of the left coronary artery and then performed the operation of cardio-omentopexy. He found that the presence of such a graft was compatible with the high degree of physical exertion, the animals, after a suitable time, being able to course as well as before. Histological study of the tissues at the points of adhesion revealed the formation of new blood-vessels. Vascular connections were demonstrable in three weeks but did not attain their full development for at least a year.

Beck was the first to utilize these observations in the surgical treatment of coronary occlusion in the human subject. His operation[6] consists in grafting vascularized fat and muscle on the heart. Skeletal muscle from the chest wall is used and fat from the mediastinum and also subcutaneous fat are available. In the earlier technique costal cartilages on each side of the sternum were removed, and a large graft of the muscle of each pectoralis major was applied to the right and left ventricles. The epicardium was removed to permit the grafts to come in contact with the coronary vessels. The pericardium was roughened so that the pericardial fat receiving its blood supply from extra-coronary sources might become attached to the myocardium. In his later operations the approach was made only from the left side of the sternum, and a graft from the left pectoralis major was employed. Powdered beef bone was placed on the surface of the heart in order to produce a low-grade inflammatory reaction between the grafts and the heart. Procaine, applied directly to the heart was found valuable. In the later cases the mediastinum was drained into the left pleural cavity. Quinidine was used routinely before operation to reduce the irritability of the heart, and also after operation, if required. The patient was placed in an oxygen tent immediately after operation. The importance of these modifications of the original procedure is indicated by the reduction in the mortality; whereas in the first twelve patients operated on the mortality was 50 per cent, in the last nine it was nil.

O'Shaughnessy's operation is, briefly, as follows[7]. After suitable premedication general anæsthesia is induced and maintained with the Tiegel-Henle apparatus, which supplies oxygen under positive pressure together with vaporized ether. With the patient on his back the chest is entered along the fifth intercostal space by an incision extending from the mid to the anterior axillary line. The fifth and sixth costal cartilages are divided near the sternum after the manner of Kirschner, and the pericardium is exposed with the help of a large Sauerbruch intercostal retractor. The phrenic nerve is crushed with a hæmostat; then the pressure in the anæsthetic apparatus is reduced from 10 to 6 cm. of water and the table is tilted to the right. As a consequence, the left leaf of the diaphragm presents, and after the insertion of two sutures the muscle is incised. Through this incision a suitable portion of the omentum is obtained and brought through into the chest. The opening through the diaphragm is then closed. The table is brought back to its original position and the degree of inflation of the lung is again increased. The pericardium is

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cautiously incised and the graft is attached to the surface of the heart and to the edges of the pericardium with fine linen thread sutures. The chest wound is then closed in layers in the usual way.

Six patients were operated on by O'Shaughnessy with favourable results, with one exception. The patient in mind, however, died of an unrelated cause, namely, hæmorrhage from a duodenal ulcer. In no case was there any post-operative shock. This work has been followed up by Davies, Mansell, and O'Shaughnessy at the Cardiovascular Clinic, Lambeth Hospital, using four types of operation. Their recent paper should be carefully studied.[8] These authors report 20 cases operated on, divided into two groups, 15 suffering from angina pectoris and 5 from other symptoms of cardiac ischæmia. In the first group there were 5 deaths and 8 of the surviving 10 are free of angina. In the second group one died and one is free of symptoms. A.G.N.

8. DAVIES, D. T., MANSELL, H. E. AND O'SHAUGHNESSY, L.: Surgical treatment of angina pectoris and allied conditions, *The Lancet*, 1938, **1**: 1, 76.

ANTI-PNEUMOCOCCUS RABBIT SERUM

THE report of the Massachussetts Pneumonia Study, in which 956 cases of that acute emergency, pneumococcus pneumonia, were treated by some 400 practising physicians with concentrated anti-pneumococcus *horse* serum, has clarified certain points about which there has not been universal agreement. The first is that the mortality from Types I and II infections, the only two types treated with specific anti-serum in this study, may be materially diminished, particularly if the serum is given early. And, secondly, that the use of anti-pneumococcus serum is not limited to large hospitals but may be given in the home Early diagnosis is no longer a difficulty, since there is available a thoroughly tested rapid method of typing the organisms directly from the sputum. Regarding the value of treatment of pneumonias caused by the higher types with horse anti-serum, in a small series of cases of Types VII and VIII the results were satisfactory but not quite so good as in the case of Type I (Finland *et al.*[1] and Bullowa[2]).

Anti-pneumococcus *horse* serum has thus proved its value in the treatment of pneumonia, yet it apparently has no effect on the complications, *e.g.*, empyema, etc. This and certain inherent characteristics of horse serum, namely, that serum sickness, chill and anaphylactoid reactions are relatively common, led Goodner and Horsfall to study comparatively anti-pneumococcus Type I *horse* and *rabbit* serum to see how they differed, and, if such differences occurred, whether it might not be advantageous to use the serum of the smaller mammal in treatment of human pneumonias and their complications. Actually, these investigators found that Type I anti-pneumococcus *rabbit* serum differed immunologically in more than thirty distinct ways from Type I anti-pneumococcus *horse* serum. The main differences were: (1) unconcentrated rabbit anti-serum has a relatively high titre of mouse protective antibodies as compared with horse anti-serum; (2) the rabbit antibody is of small size as compared with horse antibody, from experiment, three to four times smaller; all other factors being equal, this would suggest a more rapid and effective penetration through the capillaries and into infected tissue; (3) when greater than optimum amounts of horse anti-serum are injected in the mouse protection test there is often no protection, a zonal phenomenon which has not occurred with rabbit anti-serum; (4) physiological amounts of lipoids—cholesterol and cephalin—do not inhibit the action of rabbit anti-serum as they do horse anti-serum. Besides this, the immunization of horses is slow and uncertain and high titres rare, the average being 500 units per c.c., as compared with 2,000 mouse protective units per c.c., in rabbits. This has led to the relatively costly procedure of concentrating horse anti-serum, in order to increase the titre per c.c., and also to remove as far as possible the substances responsible for the chill and allergic reactions.

1. FINLAND, M., TILGHMAN, R. C., RUEGSEGGER, J. M. AND DOWLING, H. F.: *Am. J. M. Sc.*, 1937, **193**: 59.

2. BULLOWA, J. G. M.: *ibid.*, 1935, **190**: 65.

A report on the treatment of 22 cases of pneumococcus pneumonia with unconcentrated *rabbit* anti-serum by Horsfall, Goodner, MacLeod and Harris appeared in May of this year,[3] and the results are sufficiently interesting to warrant detailed comment. Ten cases were Type I, of which 8 had bacteriæmia and one of these an infected pleural exudate. All the patients recovered after serum administration; antibody was demonstrated in the pleural fluid of the one case mentioned above and no surgical interference was necessary. An average of 124 c.c., or 248,000 units, was injected, and the time interval after onset and before the administration of serum varied between 14 and 101 hours. There were 4 cases of Type II, one of which had bacteriæmia on admission and 2 infected pleural exudates. One of these patients developed empyema, was drained surgically, and died five weeks later following rupture of a dissecting thoracic aneurysm. The others recovered, and the second case with the infected pleural exudate is worthy of individual mention as antibody of rabbit origin was demonstrated in the fluid after the serum was given. This point is extremely important in any discussion on the relative merits of horse and rabbit anti-serum in treatment, since Sabin was unable to demonstrate antibody in the pleural fluid of 5 patients with circulating antibodies, and the present authors state that a review of the literature has failed to reveal any instance of the presence of antibody in pleural fluid after intravenous administration of horse anti-serum. The average amount of serum used in the Type II cases was greater, *i.e.*, 231 c.c. Treatment was begun at intervals from 50 - 145 hours after the onset. Three cases of Type VII, one with bacteriæmia, and 5 cases of Type VIII pneumococcus pneumonia, 2 with bacteriæmia, were successfully treated.

The summary of the results of treatment of the above 22 unselected cases of lobar pneumonia with unconcentrated rabbit anti-serum showed one death of a Type II case with bacteriæmia and infected pleural exudate on admission. The remaining 21 cases (Types I, VII and VIII) recovered, although 11 had bacteriæmia—even for a small series a remarkable showing.

The authors have been able to eliminate the chill reaction by special treatment of the serum, and by the use of 0.9 g. of acetylsalicylic acid before the serum is given, and recommend initial large doses to avoid the necessity of repeating. The only reactions have been mild serum sickness.

Should anti-pneumococcus rabbit serum prove its efficacy in a larger series of cases it is likely to be more widely used, since the cost of production should be less than that of concentrated horse serum. There is also the possibility that in other diseases where an anti-bacterial rather than an anti-toxic serum is desirable rabbit anti-serum may prove more efficacious than horse serum.

Since writing the above a translation of an article published in Denmark by Nissen[4] has become available. Using only Type I concentrated horse anti-serum, he obtained a marked reduction in mortality in Type I cases (2 deaths in 27 cases serum treated, and 7 in 11 not given serum). He also draws attention to the apparent success of non-specific serum therapy, in using Type I serum in all cases of pneumococcus pneumonia. The number of cases is not large enough to be conclusive, yet it seems highly suggestive that 6 of 8 cases of Type III pneumonia treated with Type I anti-serum recovered, while all the 6 untreated cases died.

ARNOLD BRANCH

3. HORSFALL, F. L., GOODNER, K., MACLEOD, C. M. AND HARRIS, A. H.: *J. Am. M. Ass.*, 1937, **108**: 1483.

4. NISSEN, N. I.: *Ugesk. f. Laeger.*, 1937, **99**: 825.

Editorial Comments

Canada's Constitution

While Canada's Constitution has permitted Canada to appoint Royal Commissions for the past seventy years, we have sitting now for the first time a Royal Commission to examine Canada's Constitution. "Confederation Clinic", it has been aptly called. Headed by the Hon. Newton Wesley Rowell, Chief Justice for Ontario, a commission of five representing all sections of Canada, and ably supported by eminent legal counsel and advisers is now engaged in listening to expositions from Provincial Governments, national associations, and other responsible bodies. It is doubtful if any Royal Commission in Canada has been called upon previously to perform a more important task than that to which reference is herein made. Family history, complaints, symptoms, pathology, etiology, therapeutics and preventive hygiene, all are passing in review and authorities from Halifax to Vancouver are making diagnosis and prescribing treatment.

At this date, it would appear that a successful issue to the labours of the Commission requires but a simple formula, namely, a plan which will reduce everybody's taxes (excepting the other person's) and, at the same time, make available to all sections of Canada all modern advantages of Government and social services. "We want to pay less and get more" would seem to be an appropriate slogan for the majority of the representations, but how pleasant it is to find at least one ray of sunshine peeping through the clouds.

The submission made to the Commission by the Canadian Medical Association, which we publish *in extenso* in this issue and which we urge all members to read, outlines plans and procedures calculated to save money and reduce taxes. While it will be observed that various recommendations are made calling for realignment of health services, it will be observed also that a word of caution is thrown in, suggesting that before Canada plunges into further expenditures in health matters a proper examination of all existing health services should be made. And it is our belief that a carefully planned policy of health protection for Canada, properly conceived and intelligently executed, can save many lives. The Royal Commission may be trusted to give most serious and thoughtful consideration to our submission, as the Chairman remarked at the close of its presentation that it was a document of great public interest and importance and one which would receive the Commission's earnest attention.

T. C. ROUTLEY

The Cyclotron

We publish in this issue a paper which departs a little from our usual selection of topics. Professor J. S. Foster, of the McGill Physics Department, has prepared for us an account of the new radiation apparatus known as the cyclotron which is to be set up at McGill. He refers to it as a powerful research tool of the physicist, and from that point of view alone it is of course exceedingly interesting. But, unfortunately, we cannot all follow the intricacies of radioactive research and this aspect therefore will only appeal to few of our readers. We can be and are directly interested in knowing something about the relationship between this new development in physics and the use of radium and x-rays in medicine.

In brief the cyclotron is able to produce radioactivity in such a substance, for example, as sodium. The question immediately arises: is this artificial radioactivity able to replace radium? Prof. Foster points out that at present it cannot, and there is little likelihood of its doing so in the near future. Radio-sodium falls off in activity to half its strength in 14.8 hours and continues to lose activity; so much so that it would be impossible to send a given quantity of it to any great distance without its losing much of its effectiveness even before arrival. Against this characteristic of course is the fact that the artificial radioactive active substances can be prepared at very much lower cost than native radium.

There are other possibilities and capabilities however in these products of the cyclotron. Many of the products can be injected into the blood stream, and an instance of experimental work in this direction is given in the work of Hamilton and Stone on leukæmia.

We may say then that there is at present no indication that the artificial radioactive products will soon replace the more stable natural radium in its present medical applications. But the subject is undeveloped, and contains most fascinating possibilities both in physics and medicine.

H.E.M.

Diet and Nutrition

In this issue can be found the first in the series of articles on "Diet and Nutrition" which we plan to publish in the *Journal* during the present year. It is from the pen of Dr. I. M. Rabinowitch and is of an introductory character. His subject is "Calories and occupation". Other topics which will be dealt with in due course are "Protein requirements in normal nutrition"; "The place of fat in the Canadian

diet''; ''Vitamins in infancy and childhood''; ''Iodine''; ''Calcium''; ''Iron''; and ''Nutritional requirements in pregnancy''. Probably there will be other papers. The series is intended to cover a subject admitted to be of the utmost importance to our people in such a way as to bring to the attention of the medical profession the most recent views in regard to diet and nutrition in a concise and easily accessible form. The busy man will appreciate this. There will be no necessity to consult weighty tomes and pages of statistics in order to get a working idea of the subject.

We are greatly indebted to the Association's Committee on Nutrition for the opportunity to publish such important matter. This Committee is composed as follows: Drs. F. F. Tisdall (Chairman), University of Toronto; G. B. Wisewell, Dalhousie University; L. N. Larochelle, Laval University; I. M. Rabinowitch, McGill University; John Wyllie, Queen's University; T. G. H. Drake and W. R. Campbell, University of Toronto; E. M. Watson, University of Western Ontario; L. G. Bell, University of Manitoba; and Heber C. Jamieson, University of Alberta. A.G.N.

L'Union Médicale

L'Union Médicale has a unique place in Canadian medical journalism. It was founded in 1872 and it has had an unbroken existence under that title. No other Canadian journal can show that record, although our own *Journal* has a longer genealogy. It is to be noted also that *L'Union Médicale* has always been privately owned, and has not depended on any medical organization for its support.

We note that with the January number steps have been taken to incorporate another journal with *L'Union Médicale*. This is the *Bulletin de L'Association des Médecins de Langue Française de l'Amerique du Nord*, and this fusion forms the official organ of that Association.

This amalgamation gives a much wider scope to *L'Union Médicale*, with corresponding members not only throughout Canada but also in New England and Louisiana, reflecting of course its representation of French-speaking medical men in various parts of North America. This, as has been pointed out in the foreword of the first new issue, was the ideal aimed at by Dr. Rhéaume, the founder of *L'Union Médicale*.

We extend our best wishes to what is not a new venture so much as a reinvigoration of an older one. We note particularly the new format adopted, in which the introduction of advertising amongst the reading matter is no longer permitted. H.E.M.

Zeitschrift für Rheumaforschung*

The firm of Theodor Steinkopff, of Dresden, Germany, announces the appearance of a new journal devoted to the subject of Rheumatism. While we feel inclined to deprecate the multiplication of medical journals we have no doubt that the publication of a special journal devoted to the study of this disease can be amply justified. Rheumatism, in northern temperate climes, at least, is a widely prevalent disease; its complications, particularly as they involve the heart, are disabling, and heart and circulatory diseases take the first place in mortality statistics. The medical and social implications of rheumatism are of first importance, and it is not surprising, therefore, that the study of this disease is being more widely and intensively taken up.

The new journal appears with the collaboration of Th. Fahr, Hamburg; K. Frik, Berlin; G. Hohmann, Frankfurt-am-Main; P. Rostock, Berlin; R. Schoen, Leipzig; A. Slauck, Aachen; H. Vogt, Breslau, under the editorial direction of Geh. Sanitätsrat Dr. P. Köhler, Bad Elster, Prof. R. Jürgens, Berlin, Dr. H. Kaether, Berlin.

The new journal is designed to collect and centralize the now widely distributed literature on the subject of rheumatism, both in foreign countries and in Germany, in the hope that the knowledge, investigation and combating of the disease may be assisted. A.G.N.

Corrigendum

We are asked to make the following correction in an item entitled ''The Regina General Hospital'', which appeared in the *Journal*, 1938, 38: 86. In line 10 first column, ''Five chronic slight suppurative salpingitis which in his opinion did not require removal'', should read, ''Five chronic salpingitis (slight) which in his opinion (Dr. Paterson's) did not require removal''. Also, in line 22, ''There were two cases of membranous hyperplasia'', should read, ''There were two cases of membranous hypoplasia'', etc.

* Zeitschrift für Rheumaforschung, Theodor Steinkopff, Residenzstrasse 32, Dresden, Germany.

Special Article

DIET AND NUTRITION

CALORIES AND OCCUPATION

By I. M. Rabinowitch

Montreal

"From the use of materials arise
physical results, such as work. . .
which we can express in heat units."—Voit.

Work cannot be performed without expenditure of energy. In fact, there can be no change of any kind without free energy, and energy does not come from nowhere; wherever it is active it must have been potential elsewhere. Man obtains his energy from his food. Expressed in terms of heat units, the average value of 1 g. of carbohydrate is 4.1 calories; 1 g. of fat yields 9.3 calories; and the energy value of 1 g. of protein is 5.3 calories. An appreciable portion of the protein molecule is, however, not completely oxidized by the human body. Its value, therefore, as a source of energy is only about 4.1 calories per g.

Normal adults of similar age, sex, weight and height, when at rest, and after having been deprived of food and fluids for twelve hours or more, show a remarkable similarity in their expenditure of energy. The chemical and physical changes which account for the expenditure of the energy under these conditions of rest and abstinence from food and fluids are generally grouped under the term "basal metabolism". *Basal* metabolism must not, however, be confused with the *lowest* metabolism; the energy expenditure during sleep, for example, is still lower. The so-called basal metabolism is, however, a valuable base-line for calculating the needs of the body under different conditions of activity in health and in disease.

The expenditure of energy by the body depends to a very large extent upon active protoplasmic mass and the greater part of this mass is in the muscles. When engaged in any occupation, therefore, the primary factor which governs the need for food is the degree of muscular activity—such factors as personal idiosyncrasy and the amount and type of food eaten are minor considerations. Women need less food than men, largely because they are, as a rule, smaller and less muscular. Their "man-value" has been estimated to be about 0.83 (Cathcart and Murray), though it has been also found to be as low as 0.7 (Abrahams and Widdowson).

Compared with the many variables which must be considered in estimating the requirements of such food elements as calcium, phosphorus, protein, vitamins, etc., determination of the minimal and optimal caloric requirements for any given occupation is simple. Data of a variety of conditions of activity are now available (Atwater and Benedict, Becker and Hamalainen, Carpenter, Lusk, Rose, etc.). The following is an example of the necessary calculations to determine the average daily caloric requirements of a metal worker:

	Calories
8 hours at work at 240 calories per hour	1,920
6 " of sitting at rest at 100 calories per hour	600
2 " " light exercise at 170 calories per hour	340
8 " " sleep at 65 calories per hour	520
Total	3,380

This approximates very closely the consumption of food materials by factory workers in Canada (Langworthy). The reliability of such data is seen in the remarkable similarity of amounts of food consumed by different people engaged in the same occupation but in different countries. Thus:

Farmer in Connecticut	3,410
" " Vermont	3,635
" " New York	3,785
" " Mexico	3,435
" " Italy	3,565
" " Finland	3,785

The above calculations, though very useful, have their limitations. Even the basal metabolism of the individual is not fixed; like most biological reactions it may, and as a rule does, vary not only in different people but also in the same individual. "Standard" diets are, therefore, meant to be used, and should be used, as *guides* only and not as *fixed* rules. "Standard" diets are *probable* requirements only; they are based upon averages obtained from many observations. They are, therefore, statistical standards and may or may not, and need not necessarily, apply to the individual. This is a fundamental fact of importance in nutrition and cannot be emphasized too often. In individual cases body weight is the best guide.

The total intake of food is not the only factor to consider in estimating caloric requirements, even when the diet is adequate with respect to all of the other elements mentioned—vitamins, minerals and protein. Maximum muscular efficiency (ability to perform any occupation with a maximum economy of food) is influenced to an appreciable extent by the source of the energy. Fatigue, for example, may be due not to lack of food but to lack of carbohydrates; muscular work is performed most economically

when the greater part of the energy is derived from such food materials.

Physical efficiency may be improved in another way without increasing the total number of calories. To Haggard and Greenberg (Diet and Physical Efficiency, Yale, 1937) Industry owes a debt of gratitude. These authors have clearly demonstrated that diminished productivity, heretofore attributed to fatigue, may in reality be due to diet and overcome not by increasing the total amount of food but by more frequent meals; a fall in productivity in the late hours of the morning and afternoon may be controlled very appreciably by small amounts of food in the form of carbohydrate. The objection that the stomach has no opportunity to rest with such frequent feedings is met by these authors with the observation that there is no evidence that the stomach needs rest, or that it ever rests even when empty. Attention is drawn to the fact that convalescents, invalids, and sufferers from gastric ulcer are fed not at long intervals, to rest their weakened or diseased stomachs, but in small amounts at frequent intervals. It is *large* meals and not *frequent* meals that put a burden on digestion and cause lassitude and disinclination for thought or work. The work of these authors fits in with the marked improvement noted previously by the writer amongst diabetics soon after their diets were made more liberal with respect to carbohydrates, and when, in addition to the usual three meals a day, some food (the equivalent of 20 g. of carbohydrate) was given in the late morning and late afternoon.

Physical efficiency may be improved in another way without increasing the total number of calories, that is, by preventing hunger, or as Carlson put it, the accessory phenomena of hunger. Hunger is a sensation which arises from contractions of the musculature of the stomach. In the child these contractions may be sufficiently powerful to cause pain. In the adult, though not sufficient to cause pain, they may cause irritability, weakness and diminished ability to concentrate. A number of conditions cause hunger contractions aside from lack of food, and one is the degree of emptiness of the stomach. Fluidity of the food is, therefore, a factor. It is, for example, a well-known fact that fluid diets, though they may be very rich in calories, are not as satisfying as solid foods. Fluids and semi-fluids tend to leave the stomach almost immediately; carbohydrate foods remain for shorter periods of time than meats, and lean meats leave the stomach more rapidly than fatty foods. Aside from their direct effect upon the musculature (their ability to slow gastric mobility) fats are satisfying because they go into solution very slowly. One-half pound of steak is much more "satisfying" than one quart of milk, though the latter has about 100 more calories. Water when taken on an empty stomach passes rapidly through the pylorus; when taken with food its passage is delayed. This explains to a large extent the pleasure of afternoon tea taken with toast.

It is possible to increase efficiency without increasing the calories in a number of other ways. There is, for example, an *optimum speed* for each occupation, that is, a speed beyond which the energy consumed is out of all proportion to the useful work accomplished. Walking to and from work is an example. Walking one mile at the slow rate of 2 miles per hour requires about 60 calories only; whereas, walking at the fast rate of 5 miles per hour, one mile consumes about 600 calories; that is, increasing the speed 2½ times is so wasteful that the energy expenditure instead of being increased 2½ times is increased over ten times. (Calculated from data in "Living Machinery", by A. V. Hill, Harcourt, Brace, 1927).

Occupation, diet and income are intimately related. The physician, with his knowledge of food values, may, therefore, be of assistance here also. At its best, the human machine is wasteful; the efficiency of human muscle is approximately 20 per cent only; in the untrained individual it may be appreciably less. Very little can be done about this inherent defect, but much may be done otherwise. A fruit jelly made of gelatine, the juice of one lemon, and a portion of raw fruit has a heat value of about 30 calories only — an amount of energy which a person weighing 150 pounds expends in about one-half hour during sleep. The plebeian bread and butter pudding, made of two slices of bread and butter, one egg, ½ pint of milk and sugar to taste, has a fuel value of 500 to 600 calories—enough to meet about 25 per cent of the total daily expenditure of energy in sedentary occupations. About one-eighth of steak, as purchased, consists of fat. By removing this small percentage of fat, the steak loses about half of its fuel value. The caloric value of one ounce of clear fat pork is equal approximately to two pounds of cabbage, and one ounce of olive oil is equal in energy value to about three pounds of lettuce. Of eighteen different proprietary foods the compositions of which are known to the writer, and the fuel values of which range from 11 to 122 calories per ounce, not one may be purchased for less than eight times, and in one instance over one hundred times, the cost of similar food materials easily prepared at home.

Restricted in scope by the limit of space, the object of this article is to outline as briefly as was thought consistent with clarity some of the more important facts about caloric contents of diets—the different values of food materials; how energy requirements for different occupations may be calculated; the limitations of these

methods; and how physical efficiency may be improved without increasing the number of calories in diets. Examples are also cited of the importance of knowledge of caloric values of food materials from the point of view of economics otherwise. When read in conjunction with the articles which are to follow in this *Journal* on the subject of nutrition, it is hoped that this outline will form a practical basis for the intelligent prescription of food materials.

Men and Books

COLONEL F. A. C. SCRIMGER, V.C.

By W. B. HOWELL, M.D.

London, Eng.

Francis Alexander Carron Scrimger was born in Montreal on February 7, 1880. He was the younger son of the Rev. John Scrimger, Principal of the Presbyterian College, Montreal. His mother's maiden name was Charlotte Gairdner. Both parents were of Lowland Scotch descent. He was educated at the Montreal High School and McGill University. When he left school to enter the Arts Faculty of McGill his parents took it for granted that he would study law after taking his B.A. degree. That he took up the study of medicine instead was largely a matter of chance. He spent one of the summer vacations of his Arts course with a geological survey in Manitoba. When the time came for the party to return, the cook was ill and could not be moved. It was therefore decided to leave someone behind to look after him. At the cook's earnest request Scrimger was the one chosen. It was a wise choice. The cook had the discernment to see that whatever happened, Scrimger would think first of him and last of himself. Scrimger was left with directions to apply hot fomentations. No one who ever knew him would need to be told that the fomentations were applied regularly, and applied hot. So hot were they applied that in the process of preparing them Scrimger's hands became painfully red and inflamed from repeated scalding. The cook recovered under his ministrations, from what Scrimger in later life thought was either typhoid or appendicitis. On his return home, Scrimger announced to his parents that he had made up his mind to go in for the study of medicine. He took his B.A. degree with honours in biology in 1901, and his M.D. in 1905.

At that time it was the custom at the Royal Victoria Hospital to fill vacancies in the house staff each spring with the men who had taken the highest standing in the graduating class of the year. Scrimger's standing at his final examination was not high enough to entitle him to a place, but he was nevertheless chosen through the influence of the late James Stewart, then Professor of Medicine at McGill and Chief Physician to the Royal Victoria Hospital. Scrimger spent four years on the house staff, one of them on the medical side, two on the surgical, and one as admitting officer.

So completely was he engrossed in his work during these years that, although he was devotedly attached to his parents who lived only a quarter of a mile from the Hospital, he could only find time to visit them once every two or three weeks. This absorption was very characteristic of him, and was due partly to his rigid sense of duty to his patients and partly to his intense interest in his work. One of his duties as admitting officer was to appear in court and give evidence as to the condition while in hospital of patients who had had accidents and were suing for damages. The impression that he gave to people who did not know him was deceptive. His unassuming bearing, his thoughtful face, his spectacles, and his low voice, were suggestive more of the somewhat diffident student than that of what he really was, a man of action. Upon one occasion an attorney with a loud voice and bullying manner, who was cross-examining him, bawled at the future V.C., "Speak up, Dr. Scrimger, don't be afraid of me".

In 1909 Scrimger went to Europe for post-graduate study. He worked for some months under Professor Bier at Berlin. One of his friends meeting him at this time was shocked at his haggard appearance, and found that he was so engrossed in his work that he was neglecting his meals and not getting enough sleep. On his return to Montreal in 1910 he was appointed clinical assistant at the Royal Victoria Hospital, and demonstrator in surgery at McGill. In 1913 he was promoted to the position of associate in surgery at the Royal Victoria Hospital. He joined the Canadian Army Medical Corps in 1912, and was appointed medical officer of the Montreal Heavy Brigade of the Canadian Garrison Artillery. In the spring of 1914 he was promoted to the rank of captain. At the outbreak of war he went, as medical officer to the 14 Battalion, Royal Montreal Regiment, to Valcartier and afterwards to England. While in camp on Salisbury Plain he was taken ill with broncho-pneumonia, and his battalion went to France without him. However, very soon after his recovery, he managed by pulling wires to be sent to France where he was attached for duty to a base hospital at Wimereux. Three weeks later he was transferred to No. 2 Canadian

Field Ambulance. The second battle of Ypres was then beginning and Scrimger had his first experience of shell fire. He was with the Field Ambulance for a very short time before being sent to rejoin the 14th Battalion. From April 22nd to April 25th he worked among the wounded in an inferno of shell fire, oblivious of peril and the discomfort due to fatigue, to lack of sleep, to filth. On the 25th a group of farm buildings, one of which he was using as a dressing station was heavily shelled and caught fire. Scrimger directed the removal of the wounded, and carried one of them, Captain H. F. McDonald, to a moat where the two men lay partly in the water under the precarious shelter of a bank of earth which threatened any minute to slide down and overwhelm them. Scrimger crouched over McDonald to protect him from flying splinters of shell and from being buried alive. When the firing slackened, he went in search of stretcher bearers and had McDonald carried to a dressing station. In a diary which Scrimger kept for a short time, he says of the incident. "I got all the wounded out, among them a staff officer. We lay together at the side of a ditch while they poured in seventy-five six-inch shells, five within but fifteen feet of us, and we were half smothered in mud. I got a good deal of credit for the show and understand something may come of it." Something did come of it—the Victoria Cross.

Scrimger's behaviour during this time is not to be explained merely as that of a brave man rising to the occasion. It was a revelation of another side of his character. There was in him a rigidity, a fixity of purpose, which made him inexorable in going through with anything he made up his mind to do. Nothing inspired him to effort like opposition or difficulty. The German army might try to prevent him from doing his job; he would go on with that job until he had finished it or been blown to pieces.

He remained with the 14th Battalion until December 31, 1915, and was then sent to No. 1 Canadian General Hospital at Etaples. Five weeks later he was invalided to England for infection of one of his fingers which had to be amputated. After he recovered he was on duty in England for a year, and then, in March, 1917, was sent to No. 3 Canadian Clearing Station at Remy Siding with the rank of Major. During the summer and autumn of that year he worked incessantly, for there was hard fighting in front of Ypres. During the following winter the work was lighter, and Scrimger took to visiting the nursing sisters' quarters. His fellow-officers are said to have accused him at this time of being "almost human".

When the great German attack of 1918 began a shell fell among the huts occupied by the nursing sisters of the Clearing Station, but fortunately did not explode and no one was hurt. Thereafter there was occasional shelling of the neighbourhood and the nursing sisters were sent to St.-Omer. The commanding officer of No. 3 received orders to send a surgical team to reinforce a C.C.S. of the 5th Army, east of Amiens. Scrimger, now senior surgeon of No. 3, urged his commanding officer to send him and accordingly he was chosen to go. His team consisted, besides himself, of Captain W. G. Lyall, who acted as his anæsthetist, two operating orderlies, and a batman. One member of the team, Nursing Sister Ellen Carpenter, who had for some time been working with him in the operating room and had been sent to St. Omer, was called for on the way. The C.C.S. to which Scrimger and his team were sent was near Roye. The wounded were being brought in in great numbers, and the team worked incessantly for three days and nights. Then, as the Germans were rapidly advancing, all nursing sisters were ordered to withdraw, and he was left without his operating-room nurse. The work of the C.C.S. soon became that of a Field Ambulance dressing station. A little later its personnel was ordered to evacuate camp and proceed towards the base. There were still 40 to 50 severely wounded men who would have been left behind to fall into the hands of the enemy. This was more than Scrimger could stand, and he and his team and an Irish R.A.M.C. officer stayed behind. They carried the wounded to a neighbouring road which was crowded with retreating artillery, with ammunition and transport wagons, and begged accommodation for them. In time all were disposed of, some even being carried on gun carriages. Not till then, did he feel free to leave. He and his team walked off with the greater part of the equipment on wheeled stretchers. They even took with them their operating table. Their personal effects were left behind.

All the technical equipment of the C.C.S. fell into the hands of the enemy. By this time the thin line of infantry which was holding back the enemy was close to the camp. Scrimger and his team, wheeling their stretchers, walked to Mont Didier, a distance of twenty miles, arriving about midnight. They found there Nursing Sister Carpenter working among the wounded and the team was once more complete. There followed days when on their way further down the lines of communication they set up their operating table and worked over the wounded, sometimes in houses, sometimes in sheds, once at least in a field. Upon one occasion, in a village where the inhabitants were unfriendly to the British, Scrimger could not at first get accommodation for Nursing Sister Carpenter, so that she could get a night's sleep. Scrimger helped himself to a mattress in one house and carried it to another, the front window of which he burst open. He put the mattress on the floor

and there the nursing sister got her night's rest. There was nothing about Scrimger when he was thoroughly angry that encouraged argument or even discussion, though he did not lose control of his temper or raise his voice, and there was little change in the expression of his face.

In April, 1918, Scrimger and his team returned to No. 3 C.C.S. and his engagement to Nursing Sister Carpenter was announced. The wedding took place in September. After the honeymoon, Scrimger returned to France with the rank of Lieutenant-Colonel, and was for some time in charge of the surgical side of No. 3 Canadian General Hospital. Later, after peace was declared, he was for three months on the staff of the Plastic Surgery Hospital at Sidcup. He returned to Montreal in May, 1919, was demobilized and went back to civil practice. He was that year appointed assistant surgeon to the Royal Victoria Hospital. In 1934 he was advanced to the rank of surgeon, and in January, 1936, he became director of the Department of Surgery and Associate Professor of Surgery at McGill. He was appointed Surgeon-in-Chief of the Children's Memorial Hospital in 1934.

As the years after the War went by, Scrimger worked harder and harder. When he reached an age at which he would have been wise to take life easily, he was as unsparing of himself as he had been when he was young. His private practice steadily increased. More and more responsibility was laid on his shoulders at the Royal Victoria Hospital. He gave a great deal of time and thought to teaching and to preparing papers to be read upon medical subjects. He was appointed consulting surgeon to the Laurentide Pulp & Paper Company, and had often to motor at night to Shawinigan to operate, a distance there and back of about 200 miles. Many times his usual strenuous day's work followed a night spent in this way. The short holiday he took every summer at Bic, where he had a cottage, was almost as strenuous as his working days. His chief amusement there was sailing, his crew being his children and their friends; another was being his own stonemason and building additions to his property.

In November, 1934, he received sudden unmistakable warning that the time had come for him to stop overworking his body. On his way to a meeting of surgeons at Philadelphia when he was lying in his Pullman berth he was attacked by a sudden violent pain which extended from the region of the heart into the neck. He at once realized the significance of the pain, and reaching for his notebook wrote a message to his wife.

He then sent a telegram to his friend Dr. Eltinge at Albany, describing his condition. Dr. Eltinge met him at the station and took him in an ambulance to a hospital. He was brought home shortly afterwards and for six weeks was kept at complete rest. He submitted to this treatment with characteristic thoroughness, but with self-forgetfulness, equally characteristic. On resuming his duties he continued to work too hard. He received no second warning. The next attack occurred on February 13, 1937, and after a few hours ended in death.

Scrimger was a man of unusual ability and character. He was a born surgeon. Sound in diagnosis, sound in judgment, he was a quick and dexterous operator. He had the power of making up his mind quickly, one of the most important gifts of a good operator; and he knew what very few surgeons know, when to stop.

He inherited the best qualities of his Lowland Scotch forefathers. He was a "quiet" man, to a certain extent "dour". His inflexible honesty, helped perhaps by his sense of the ridiculous, kept him free from even the slightest taint of humbug or snobbery. There was not an atom of laziness in his composition. It was this that led to his death at a comparatively early age, for he allowed his work to kill him. Though he had complete confidence in himself he was without conceit. He was never heard to allude to his V.C. nor to any of his other achievements during the Great War. No one ever practised his profession with less mercenary motives. A public patient got just as much of his attention as a private one. What faults he had were of the kind that the hosts of friends who mourn him would not have wished to see amended.

—(By permission of "The Canadian Who Was Who.")

THE POST HOC ERGO PROPTER HOC FALLACY IN MEDICINE

BY ROBERT DAWSON RUDOLF

Toronto

I almost feel that I should apologize for calling your attention to the subject of this paper, but surely it is an important one. Are we not all apt to assume too easily that because something follows something else it must be due to it? in other words that the forerunner is the cause of the aftercomer?

The difficulty of attributing a right cause to something is very great, and mistakes have led to all sorts of errors in diagnosis and treatment. As E. Graham Howe[1] says: "If we are to be accurate we must recognize not a cause but always a relationship, and the advantages derived from our knowledge of bacteriology have to some extent been outweighed and lost by the way in which it has been conceded an importance out of balance and beyond its due, by tending to ignore the vital factor of variations in the patient's immunity. . . It is today generally agreed in theory, although not always

recognized in practice, that disease is essentially an interaction between seed and soil, in both of which there is a convergence of a sequence of related events, from the association of which the effect is developed." When a man takes pneumonia the cause may be said to be the pneumococcus, or the chill which lowered his vitality and so allowed the germ, which may have been present in his upper air-passages for years, to act. The chill may have been due to his sleeping in a ditch, and the cause of his so sleeping may have been the alcohol that he had consumed at the local public house, and this unwonted excess may have been due to the fact that he had won a prize in the Irish Sweepstake, and so on. Which factor was the cause of the infection? There is no end to this game of seeking for the cause. As Howe[2] says on this point, "It is rather curious that the search for the 'first cause' should for so long have been regarded as scientific orthodoxy, when philosophy had already recognized the principle of the recurring decimal in what is described as the 'infinite regress', and Roman Catholicism had regarded it as a valid proof of the existence of God. There is no answer to the question, 'which came first, the chicken or the egg?' and there is no answer to the question of 'what is the cause?' except the somewhat unsatisfactory one, 'whatever may have been your original hypothesis'." It may be objected that certain factors are of vital importance, and that being run over by a 'bus really is the cause of a broken leg. However, this undesirable experience may be expressed more accurately, although at greater length, by describing it as an intersection of two time-sequences, in which the 'bus time-sequence crosses the leg time-sequence, with disastrous effects upon the leg. Cause is but a phantasy and a convenient fiction which knowledge may much more accurately bridge with the time concept. To quote from Marcus Aurelius Antoninus to himself, "Subsequents follow antecedents by bond of inner consequence; it is no merely numerical sequence of arbitrary units, but a rational interconnection. And just as things existant exhibit harmonious coordination, so too things coming into being display not bare succession but a marvellous internal relationship."

Diagnosis includes not merely the labelling of the condition but a search for the nature of it and for the cause or causes that may have brought it into being.

Fever and ague had been noticed by primitive peoples to occur most often in persons who slept near marshes and other collections of stagnant water. This was a correct observation. The hypothesis arose that the miasma that rose from such places was the cause of the disease (the name "malaria" means this). Then next that an evil spirit that dwelt in such mist entered the victims and was the cause of the trouble. Here was an example of what logicians call the undistributed predicate. The native case seemed to be proved by the fact that when people camped above the mist they were less apt to be attacked. But of course there were other things near the water than the mist and now we say that the reason why people often escaped when they remained at an elevation is because the Anopheles mosquito does not fly high.

How often do we see some condition attributed to syphilis which is really due to some other cause? The patient gives a strongly-marked Wassermann reaction and therefore undoubtedly suffers from the results of venery (barring yaws, which after all has been called "stone-age syphilis"), but the ulcer that we find on the leg or the bronchitis from which he suffers may have no connection with this infection. During the Great War one frequently saw lesions diagnosed as syphilitic, with all the trouble that this entailed to the patients, because the Wassermann test was said (often on very insufficient evidence) to be positive, when the lesions were independent of this infection.

Most of us can recall the mistakes that we made when the von Pirquet skin test for tuberculosis was first introduced. It certainly denoted that tuberculosis was present, but we now know that the great majority of people have this in quiescent form. Tuberculous people may of course suffer from all the ailments to which flesh is heir. I recall the case of a young woman who had a persistent dry cough. Her doctor found a small pimple on one of the vocal cords and that the von Pirquet reaction was present. She was about to be sent to a sanatorium, when a laryngologist saw her and diagnosed and removed a simple wart with complete success.

Another case comes to mind where the undistributed predicate led to error. A woman well up in years was first seen in an apparently comatose condition which had followed some domestic argument. Her elderly daughters said that she often had such attacks when annoyed. I noticed as I walked about the room that her eyes would follow me, although when spoken to she seemed to be quite unconscious. I was told that when no one was about she would get up and go to the toilet. The case seemed to be a functional one, and the late Professor McPhedran who saw her with me agreed in this. But she did not improve and gradually became really comatose and at last undoubted signs of cerebral compression developed and she sank and died. The post-mortem examination showed a cerebral abscess. Here we were misled by the history and wrongly assumed that the whole condition was hysterical.

The *post hoc ergo propter hoc* fallacy was and still is constantly seen in military work and after accidents of all kinds. Of course, in some

of the cases there is an element of fraud, but in most this is not so. A man suffers from bronchitis. He was gassed in the war. Is the former due to the latter? A shell bursts in the vicinity of a group of soldiers. Most of them are unaffected and some may even treat the event as a grim joke. But a few suffer from so-called shell shock. How much had the explosion to do with their condition? A careful history often revealed the fact that they were potential neurasthenics, and the shock was only the last straw that precipitated the collapse. I recall a case of an old gentleman who was knocked down by a street car. He was kept in bed for a while, but did not recover, and finally developed symptoms and signs of gastric carcinoma from which he died. The company were sued by the estate for damages, the claim being that the cancer was due to the injury, and eventually compromised. The time-sequence of cancer of the stomach and that of the traumatism happened to cross, but there was no causal connection. Only last week I came across another example of this where a man died of cancer of the stomach, and his friends were sure that it was due to gassing during the war twenty years before.

It is in considering the results of treatment that one most commonly sees the fallacy that we are discussing. The satisfaction of the practitioner in his patient's recovery may well be tempered by the thought that the happy issue may be due to many other causes than his skilful treatment. These may be a legion— "the patient's natural capacity for recovery, possible changes of external circumstances, the advantages of an enforced period of rest, or the satisfaction of a relationship between the patient and the physician, which quite erroneously endowed the latter with the power and the wisdom which were not really his, but nevertheless afforded the patient a great deal of comfort and of courage."[3]

In ancient times treatment was at first empirical, and lower animals, who have quite a therapy of their own, never get beyond this stage. But man, being a thinking animal, started to theorise on the origin and nature of disease and its subsequent treatment, and has thus advanced, although many of his theories have led to all sorts of mistakes and extravagancies. He had empirically found that cinchona relieved fever and ague, and in this was right, but his theory that the trouble was due to an evil spirit and that cinchona acted as a spirit-scarer was wrong. It is interesting to note that if we replace the idea of an evil spirit by the modern one of an infecting agent how near the ignorant savage was to the truth.

In heart failure the patient is given digitalis and probably quickly mends, and we are apt to think that the drug was the cause of the improvement. Now, no one will for a moment doubt the enormous value of foxglove in such cases but we are apt to ignore the good influence of rest and other factors. Recently Evans[4] has elaborated this point. In cases admitted to hospital with symptoms and signs of heart failure complete rest with restriction of fluids, without any drugs, was followed by restoration of compensation, and, strange to say, by diuresis. Sir James Mackenzie constantly urged the value of these other factors that usually accompany the use of digitalis.

Think what a number of drugs that for years had an honoured place in the pharmacopœias have fallen by the way. All used with apparent success and then found to be inert, the good results having been sequences to other factors than the drugs. They have gone the way of human urine, fæces, mice, toads, the washings from the tombstones of saints, etc., all of which had their day.

Some years ago, at the time when the belief existed that calcium would check bleeding by lessening the coagulation-time of the blood, I heard a paper read at a medical society endorsing this view. In the discussion a member detailed several cases where hæmorrhage seemed to have marvellously ceased after medication, "but", he paused, and then went on to say, "by mistake I had prescribed sodium citrate instead of the calcium salt".

J. A. Ryle,[5] Regius Professor of Physic in the University of Cambridge, recently wrote, "We are pessimistic sometimes, but often as hopeful as the untutored laity, and as slow almost to distinguish between the 'post' and the 'propter' in assessing the results of treatment".

One is frequently struck by the enormous differences in results obtained by different men using some similar method of treatment. It is often cynically said that nothing lies like statistics, but think of the number of factors involved, all of which may prejudice the results, or rather the sequences of the therapy; the type of infection and its virulence (which always tends to lessen as the epidemic proceeds), the age, the sex, the nationality, climate, and so on. It must always be remembered that the treatment is only one of the preceding factors involved. In such instances as the value of vaccination as a preventative of small-pox, of antitoxin in diphtheria, insulin in diabetes, liver extract in pernicious anæmia, and in many other cases, tables of statistics are extremely convincing, But often they are less so and may even damage the progress of therapeutics. The mistake usually occurs through deducing a rule from too small a number of instances—in fact arguing from the particular to the general. But even when the numbers are considerable great differences may occur. Thus, in the treatment of pneumonia in children, Hipple, Goldsmith and Freeman[6] showed a mortality following the

intravenous use of mercurochrome of 5.7 per cent and one of 10.3 per cent in the controls—very convincing until one reads[7] that the mortality rate in the London Hospital in 836 cases of the same disease in children, where only expectant treatment was employed, was only 1.7 per cent. In mortality rates from hæmorrhage in ulcer of the stomach and duodenum very different figures are given by different writers. These vary from 1 per cent, according to Eggleston in 95 cases, to 25 per cent, according to Chiesman, of St. Thomas's Hospital, in 191 cases.[8]

I will not further stress the uncertainty of figures, but merely repeat that the greater the number of cases employed, with efficient controls, the less the chances of error. What can one say of a statement made not long ago at a medical meeting by a practitioner who claimed a 100 per cent success in some operation, and when asked how often he had so operated he honestly admitted that he had done so only once!

Controls, as said, are essential in the investigation of any new treatment, and the difficulty is that when an apparently valuable method is discovered we are loth not to use it, when by omitting to do so lives may possibly be lost. This of course does not apply to animal experimentation, but there is a great deal of difference between the reactions of animal and man, and so the results can only be taken *cum grano salis*. The value of convalescent serum in the treatment of poliomyelitis anterior acuta is a case in point. The serum must be given very early before any paralysis has appeared, and the difficulty of diagnosis at this early stage is very great, even with the aid of spinal puncture, which after all is of no value in the first stage of the disease.[9] Many cases that were not of this infection at all will be given the serum, and of course many of these patients do not develop any paralysis in any case. An excellent statistical study of this matter was that of W. H. Park[10] where he tabulated 927 cases of the disease, 519 of which received the serum and 408 did not do so. Paralysis developed in 19.6 per cent of the former and only in 1 per cent of the latter. Also the mortality of the serum-treated cases was 3.8 per cent as compared with one of 0.9 per cent in the controls. Last year W. D. Davison,[11] in a summary of the immense literature on this subject, wrote thus: "Many still believe that the serum has value when given intravenously or intramuscularly as soon as the first symptoms occur and before the onset of paralysis, especially in large doses of 100 to 300 c.c. and by transfusion. However, the evidence gained by treating alternate patients and by the observation of controls seem to show conclusively that no benefit is produced."

The natural history and course of a disease must be studied before we can gauge the value of any therapeutic measure. As a leader writer in *The Lancet*,[12] puts it: "Unless a practitioner makes a mental picture of the probable course of the disease, the course of treatment he prescribes may be unwise or at the best unnecessary. In the words of Hippocrates, he will carry out the treatment best if he know beforehand from the present symptoms what will take place later".

Thus, both in diagnosis and in treatment it is necessary that we go warily lest we be guilty of the fallacy of *post hoc ergo propter hoc*.

I would be sorry if it seemed from this paper that I were a cynic or a sceptic over medicine. I have far too great an appreciation of the enormous advances that have been made both in diagnosis and treatment for such a verdict, but *dubitando ad veritatem venimus*, which, being interpreted, means that by doubting we arrive at the truth.

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COMPARISON OF MANDELIC ACID AND SULFANILAMIDE AS URINARY ANTISEPTICS.—H. F. Helmholz avers that the introduction of mandelic acid and sulfanilamide has greatly improved the chances of curing urinary infections. Mandelic acid is dependent for its action on a concentration greater than 0.5 per cent and a pH of the urine less than 5.5, so that it is not likely to be successful unless the function of the kidney is normal or nearly so. The inability to reduce the pH of the urine of patients with Proteus infections makes mandelic acid therapy almost useless in the treatment of such infection. Its action on *Streptococcus fæcalis*, however, makes it the antiseptic of choice for this type of infection. Sulfanilamide, because of its ease of administration and tolerance by the stomach, is the drug of choice, however, in the average case, and it has the added advantage that it can be used during the acute stage of the disease. Acting best in an alkaline urine, sulfanilamide should be extremely useful in treating infections of the Proteus group. Its striking ineffectiveness in the treatment of *Streptococcus fæcalis* infections, however, is a definite handicap. These two drugs, one acting only in an acid and the other best in an alkaline medium, supplement each other, and they should be used in the treatment of urinary infections according to the type or types of organisms causing them.—*J. Am. M. Ass.*, 1937, **109**: 1039.

Association Notes

The Sixty-ninth Annual Meeting of the Canadian Medical Association, Halifax, N.S., June 20-24, 1938, Meeting Conjointly with the Nova Scotia Medical Society

The following preliminary announcement in regard to the speakers who may be expected deserves attention. The Presidential Address will be given by Dr. T. H. Leggett, Ottawa. The Osler Lecture on "Osler, the Last Phase, and his Influence on Medicine", will be delivered by Sir Humphry Rolleston, Bt., Surrey, England.

A Surgical Clinic on "Cancer" will be conducted by Dr. M. R. MacCharles, Winnipeg, and Dr. Wm. Boyd, Toronto. A Medical Clinic will be conducted by Dr. J. C. Meakins, Montreal. There will be a Symposium on "Poliomyelitis".

Among the visitors will be two speakers from England, whose names are not yet available, and, from the United States, Drs. Douglas Quick, New York; F. C. Irving, Boston; Eugene F. DuBlois, New York; Lincoln F. Sise, Boston; and A. W. Adson, Rochester, Minn.

The Canadian speakers whose names have been received up to date are the following: Drs. J. T. Phair, D. E. Robertson, M. R. MacCharles, Wm. Boyd, A. F. Miller, E. E. Cleaver, Fred McKay, Wesley Bourne, E. W. Lunney, J. C. Houston, L. C. Montgomery, G. F. Strong, A. H. Gordon, G. K. Wharton, J. H. Palmer, H. R. Clouston, A. F. VanWart, A. L. McLean, D. Nicholson, W. P. Tew, Ross Mitchell, E. V. Shute, John Fraser, P. J. Kearns, L. de V. Chipman, W. J. McNally, J. A. Sullivan, W. G. M. Byers, L. R. Teasdale, T. M. Sieniewicz, Geo. Campbell, A. P. Hart, J. E. Gendreau, W. A. Jones, E. H. Shannon, W. S. Barnhart, A. A. Fletcher, J. W. Merritt, Douglas Taylor, L. J. Austin, W. E. Gallie, Roscoe Graham, G. A. McIntosh, D. W. G. Murray, and W. O. Bigelow.

A more complete program will appear later.

It lies within the memory of most of us when the Annual Meeting of the Canadian Medical Association was a gathering of the male members of the profession. Few indeed were the wives who came with their husbands, looking forward to the gathering as a social event. Unless they had relatives or friends to entertain them, they sat about hotel corridors, "nursing their wrath to keep it warm", or relaxed by going on a shopping "spree", both sources of sadness to friend husband in the evening, who needed a cool hand to stroke his fevered brow, and enough money to pay his debts, just and unjust. As for the children, large and small, they stayed at home as a matter of course.

In the words of the music hall ditty, "Those days are gone forever". We are planning that at the meeting in Halifax next June the doctor, his wife, and their children will have a glorious time. This old city was adapted by nature and by art as a playground. At our door is the sea; behind us a verdant countryside dotted with beautiful lakes and hills; within our gates are sporty golf links, and athletic clubs. All these natural and artificial sources of pleasure, relaxation and amusement will be drawn upon for your enjoyment. Just to give you an idea of what we hope to do, have a glance at our plans.

The North-West Arm, a beautiful inlet from Halifax Harbour, has on its sloping, wooded shores the Waegwoltic Club. This will be the headquarters for the entertainment of the juniors, and here they will hold a dance—a dance all their own. There are supervised facilities for bathing, swimming and diving, in salt water with a tang. On the grounds are excellent tennis courts and quoit beds, while the clubhouse affords the usual facilities for indoor entertainment. The young folk will enjoy this place, and mother and dad may go about their own amusements without a worry or care. Now and then the ladies will join them of an afternoon for tea and a share of the fun. In their turn, the young people will join the grown-ups on picnics at famous beaches and beauty spots.

If the ladies take advantage of all the activities the committee plans for them the days will not yield a dull moment. There are drives inland along the beautiful Dartmouth Lakes, and a coffee party will be held at a well-known summer inn on their shores. Those who are interested in sightseeing, in the study of sites where history was made, will find means to enjoy themselves to the utmost. Private yachts will be at hand to give you a taste of the sun and sea, and all who wish may have a voyage on the quiet inland waters of the Harbour, Bedford Basin and the North-West Arm. Peggy's Cove, the joy of the artist, will be visited. A garden party at Government House is planned. The golf links will have a special visit, with a tea and bridge. At the President's Ball, the ladies will have a chance to meet their husbands.

According to tradition the doctor will be fed with food for the mind and body *ad lib*. There will be lunches daily with speakers planned to entertain, instruct, perhaps amuse. In the evening there will be more food and more fun, so bring along your best liver. Of course after the serious business of the week is past will come the golf tournament, and a final wind-up which promises to be a benediction in itself.

Now, Doctor Jones, if the final argument is needed to convince you that you should attend

this Halifax Meeting, just pass over your *Journal* to Mrs. Doctor Jones, who with William Junior and his sister craning their necks over her shoulder as they read, will furnish it *instanter*. We hope you have not forgotten our advice to make your mind up and book your reservations early.

The Committee desires those intending to enter Scientific Exhibits to reply to the circular letter sent out, as plans must be made for featuring this valuable adjunct to the best advantage. We have reason to believe that they will be most instructive.

A Submission by the Canadian Medical Association to the Royal Commission on Dominion-Provincial Relations Canada, 1937

In the past the Canadian Medical Association has persistently advocated three national measures. First, a Federal Department of Health, whose sole business would be to look after the health of the people of Canada. Two, the acceptance of the principle that the medical care of the casually and chronically unemployed is a responsibility of the national government. Third, the appointment of a Royal Commission to investigate the whole question of medical services to the people of Canada.

At the meeting of the Executive of the Canadian Medical Association last October, it was decided that these matters should be placed before the Royal Commission on Dominion-Provincial Relations, and the Chairman of General Council and the General Secretary were instructed to prepare a brief for submission to this Body. Advice was sought and valuable suggestions came from every one of the nine provincial associations. The result is embodied in the following brief. It was sympathetically received by the Commission and the questions asked by the members showed keen interest.—[ED.]

Coincident with Confederation the Canadian Medical Association came into being in 1867. There are nine provincial medical associations in Canada, all of which are affiliated Branches of the Canadian Medical Association; and, on behalf of the Canadian Medical Association and its nine Branches, and in the name of more than 6,000 Canadian physicians and surgeons, this brief is respectfully submitted.

The objects of the Canadian Medical Association may be recited in part as follows:

(*a*) To cultivate the science of medicine and surgery.

(*b*) To advance the character and honour of the medical profession.

(*c*) To further unity and harmony among its members.

(*d*) To ensure the observance of legal duties and obligations imposed on the profession in medical matters by the different statutes or by the principles of ethics established by the Association.

(*e*) To promote the public health.

(*f*) To elevate the standard of medical education, both under-graduate and post-graduate.

(*g*) To assist in the advancement of medical education for the good of the public and the profession.

(*h*) To study and advance by any means within its power the improvement and standardization of hospitals.

(*i*) To conduct or assist in conducting research work in connection with the different medical problems that from time to time confront the profession.

(*j*) To serve humanity and the medical profession by investigation, study, and research work in connection with all matters in which the profession can properly interest itself and to do any necessary act or thing in the premises.

(*k*) To do such other lawful things as are incidental or conducive to the welfare of the public and of the medical profession.

The foregoing objects might perhaps be appropriately epitomized in the following words: "The promotion of health and the prevention of disease". It will hardly be argued by any thinking person that greater responsibilities or more important functions rest upon any group of Canadian citizens. As an organized body we are concerned with Canada's greatest asset, the health of her people. It would, therefore, seem appropriate that our voice should be heard by this Royal Commission, charged as you are with the grave responsibility of examining, diagnosing, and recommending treatment for, those ills of our people, be they economic, social or political, which, in your opinion require to be corrected or cured in order that the nation may enjoy health in the broadest conception of that word.

You have already heard and will no doubt continue to hear outpourings of symptoms, with their causes and suggestions as to cures. While there may be marked similarity in symptoms, you will no doubt find sectional divergences as to causes and recommendations as to cures, all of which will undoubtedly call forth the highest degree of diagnostic skill of which the members of the Royal Commission are capable. Rather than add to your heavy burden, we wish to introduce a concept of health responsibility which, we trust, will prove logical to you and receive emphasis in your final recommendations. Disease and ill health present exactly the same picture in Halifax as in Victoria. There are no municipal, provincial or Dominion statutes which in any way alter the problem of dealing with a case of diabetes or infantile paralysis or cancer, in any part of Canada. The broad question of health preservation gives rise to no sectional differences of opinion, and, therefore, as one voice, not as nine or ninety-nine, we are enabled to submit for your consideration the following observations.

RELATION OF BRITISH NORTH AMERICA ACT TO HEALTH

The British North America Act of 1867 gave certain rights to the parliament of Canada and to the provinces. The following extracts relating directly or indirectly to health have been taken from the British North America Act:

"Section 91—It shall be lawful for the Queen, by and with the advice and consent of the Senate and House of Commons, to make laws for the peace, order and good government of Canada, in relation to all matters not coming within the classes of subjects by this Act assigned exclusively to the Legislatures of the Provinces; and for greater certainty, but not so as to restrict the generality of the foregoing terms of this Section, it is hereby declared that (notwithstanding anything in this Act) the exclusive legislative authority of the Parliament of Canada extends to all matters coming within the classes of subjects next hereinafter enumerated; that is to say:

2—The regulation of trade and commerce;

3—The raising of money by any mode or system of taxation;

6—The census and statistics;

7—Militia, military and naval service, and defence;

10—Navigation and shipping;

11—Quarantine and the establishment and maintenance of marine hospitals;

12—Sea coast and inland fisheries;

17—Weights and measures;

22—Patents and invention and discovery;

24—Indians, and lands reserved for the Indians;

25—Naturalization and aliens;

27—The criminal law, except the constitution of courts of criminal jurisprudence, but including the procedure in criminal matters;

28—The establishment, maintenance and management of penitentiaries;

29—Such classes of subjects as are expressly excepted in the enumeration of the classes of subjects by this Act assigned exclusively to the Legislatures of the Provinces.

And any matter coming within any of the classes of subjects enumerated in this Section shall not be deemed to come within the class of matters of a local or private nature comprised in the enumeration of the classes of subjects by this Act assigned exclusively to the Legislatures of the Provinces.

Section 92—In each province, the Legislature may exclusively make laws in relation to matters coming within the classes of subjects next hereinafter enumerated; that is to say:

2—Direct taxation within the province in order to the raising of a revenue for provincial purposes;

6—The establishment, maintenance, and management of public and reformatory prisons in and for the province;

7—The establishment, maintenance and management of hospitals, asylums, charities and eleemosynary institutions in and for the province, other than marine hospitals;

8—Municipal institutions in the province;

14—The administration of justice in the province, including the constitution, maintenance, and organization of provincial courts, both of civil and criminal jurisdiction, and including procedure in civil matters in those courts;

16—Generally all matters of a merely local or private nature in the province.

Section 93—In and for each province, the Legislature may exclusively make laws in relation to Education . . . .

Section 95—In each province, the Legislature may make Laws in relation to Agriculture in the province, and to immigration into the province; and it is hereby declared that the Parliament of Canada may from time to time make laws in relation to agriculture in all or any of the provinces; and any law of the Legislature of a province relative to agriculture or to immigration shall have effect in and for the province as long and as far only as it is not repugnant to any Act of the Parliament of Canada."

It will be noted that public health is not mentioned in the British North America Act excepting in so far as the above mentioned Sections quoted from the Act may be said to be related to public health. Public health as it is understood today, was unknown to the Fathers of Confederation, which no doubt explains why the Act fails to assign complete responsibilities in this field. It might be pointed out that Clause 29 of Section 91, quoted above, might be and indeed has been interpreted by some eminent legal authorities to mean that, as public health is not expressly mentioned as one of the classes of subjects for provincial control, it automatically becomes a subject of Dominion responsibility.

Because of differences of opinion as to legal interpretation of the British North America Act with reference to public health, the provinces did assume certain responsibilities in public health, and, up to the present, the Dominion authorities have shown no desire to interfere with what has been done. It does seem to us desirable, however, that the fields of responsibility in public health, as between the Dominion and the provinces, should be clearly defined.

PROGRESS SINCE CONFEDERATION

In order to understand how entirely the situation with regard to public health and the care of the sick has changed since Confederation, it would be wise to cite a few facts.

At the time of Confederation, the only diseases against which quarantine would be established, would probably have been smallpox, cholera, and bubonic plague. There was as yet no definite knowledge of the bacterial origin of disease. The whole mass of knowledge of the cause and preventability of infection in wounds, what we now call sepsis, still had to wait for Pasteur and Lister, and their colleagues and successors.

Maternal mortality was shocking, rising very high at times, even exceeding 25 per cent. The cause of child-bed fever was still unknown.

The cause, and hence the control of tuberculosis, was still unknown. As late as 1900 the considered opinion of an eminent authority was that tuberculosis was the cause of one-half the sickness and one-third of the deaths in Europe.

The origin of typhoid and its controllability were not known until twenty-five years after Confederation.

Only emergency surgery was done and the death rate in all surgical operations was very high, the chief cause of death being septic infection. Anæsthesia had not yet become possible.

There was absolutely no operative orthopædic treatment for the crippled or deformed. The crippled children must remain crippled.

Practically none of the elaborate equipment which leads to the establishment of an accurate scientific diagnosis had yet appeared. The hospitals at the time of Confederation were little better than poor boarding houses for the bedridden sick and though the hospital authorities did all that they then knew, often with a spirit of self-sacrifice and utmost kindness, the condition of the wards was terrible. The hospitals of that time resembled the present institutions only in name. They still considered it proper and kind and as comfortable as could be expected to put two or three public ward patients in one bed. Modern sanitation was unknown. Naturally, the cost of operation of these institutions was low, probably averaging around 75 cents per patient per day.

Our knowledge of the nature of disease and of scientific diagnosis and treatment has increased more in this period than in the previous 500 years, and, naturally, the cost of providing these services has increased along with the increase of accuracy and actual value of the services rendered.

While under the British North America Act the provinces were charged with the establishment, maintenance and management of hospitals, asylums, etc., it did not necessarily follow that provincial jurisdiction covered the whole field of health, because in 1919 the Dominion Health Act was passed, which added to previous Dominion responsibilities in the field of health the following:

1. Cooperation with the provincial, territorial and other health authorities, with the view to coordination of the efforts proposed or made for preserving and improving the public health, the conserving of child life, and the promotion of child welfare.
2. The establishment and maintenance of a national laboratory for public health and research work.
3. The supervision as regards public health of railways, boats, ships and all other methods of transportation.
4. The supervision of federal buildings and offices with a view to conserving and promoting the health of the civil servants and other government employees therein.
5. The administration of the following Acts: the Quarantine Act; the Public Works Health Act; the Leprosy Act; the Proprietary or Patent Medicine Act.
6. Such other matters relating to health as may be referred to the Department by the Governor General in Council.

The Dominion Health Act goes further, as in Clause 4 the duties of the Minister are defined as follows:

"The duties and the powers of the Minister administering the Department of Health shall extend to and include all matters and questions relating to the promotion and preservation of the health of the people of Canada over which the Parliament of Canada has jurisdiction."

NEW PROBLEMS IN DISEASE

The Honourable Josephine Roche,* Under-Secretary of the Treasury in charge of Public Health for the United States Government, has published some interesting figures from which we quote:

"(*a*) Fifty years ago 94 per cent of all mortality from disease was from acute illness, chiefly infections. (*b*) Today, 75 per cent of all mortality from disease is from chronic illness.

Listed according to the death rates for which they are responsible, the ten most frequent causes of death are: heart disease; cancer; pneumonia and influenza; cerebral hæmorrhage; nephritis; tuberculosis; diabetes; diarrhœa and enteritis; appendicitis; syphilis."

While the foregoing statistics relate to the United States, it may be assumed with reasonable certainty that the figures will be applicable in a very large measure to Canada. Among the diseases quoted above should lie, to a large degree, the great future of preventive medicine in public health. It is obvious, however, that no appreciable improvement can be looked for until the sources of diseases are recognized and eradicated. This can only be done through preventive health work which—

1. Must include systematic physical examinations at all ages of life.
2. Must take into account living conditions, habits of life and economic conditions.
3. Must enlist every medical practitioner and all other health workers as part of the preventive forces of the country.
4. Must provide for adequate diagnostic and laboratory services to all the people in our country.

We submit that the program suggested cannot be effectively carried out unless it becomes a nationally supported undertaking, enjoying some measure of guidance and support from the Federal Government acting through a strong Federal Department of Health.

RECOMMENDATIONS

We, therefore, beg to suggest that the field of responsibility for the Dominion in health measures should include:

1. Those services now provided by the Dominion and for which the Dominion is legally responsible, as outlined in Section 91 of the British North America Act.

2. Public health leadership through the further building up of a staff of such competence and recognized ability within the Department of National Health that their advice will be sought and accepted. This would not require any change in the British North America Act, but it might imply a change in the point of view of the Dominion authorities, namely, a determination to give leadership and not to seek to avoid responsibility in public health by stating that

* *The Lancet*, Nov. 6, 1937, page 1097.

it is a matter for the provinces. Leadership would mean the planning of methods whereby all citizens would have the full benefits of public health services, and the devising of ways and means to make such plans effective, such as establishing standards for the qualification of health workers. That such a suggestion is feasible has been demonstrated by the United States Health Services which has no legal control over matters of public health in the individual states, but whose leadership is recognized throughout the country because of the merits of its staff.

3. The acceptance of the policy of making grants-in-aid to the provinces for province-wide public health activities, and, through the provinces, to local areas for local public health services. Such grants-in-aid should be given only when the province or the local area demonstrates its ability to do a worth-while piece of work, and, further, expresses its willingness to contribute to the cost in accordance with its own economic resources. Further, any such grants-in-aid should be contingent upon the piece of work being maintained according to standards for such work which would be established by the Dominion Health authorities. Grants-in-aid should be offered for specific pieces of work, for example, to encourage programs for cancer control, venereal disease control, tuberculosis control, mental hygiene, maternal welfare, child welfare, nutrition, health education, housing and sanitation. This suggestion calls for no change in the British North America Act, as the Dominion some years ago established a precedent by its grants-in-aid to the provinces for venereal disease control.

4. Contributions to assist in research and such investigation as is directly related to the public health would be in line with progressive development. The best results are often most readily obtainable through the support of such research in centres where proper facilities and staff are already available, rather than in the creation of new facilities. Competent authorities in the health field throughout the world are unanimous in their opinion as to the great need and value of medical research. A Medical Research Council, as a part of the National Research Council, which would be available to assist in medical research throughout Canada, should be established.

5. Financial support should be available for nationally organized voluntary health agencies in order that they may be assisted in their pioneer efforts in their various special fields, to educate the public, and to gain support for official public health developments in a way in which the official Departments of Health cannot proceed by themselves. When once a piece of work is definitely proved and established by a voluntary organization, it would then seem appropriate for that work to be taken over and carried on by the official Public Health Department.

DEPARTMENT OF PENSIONS AND NATIONAL HEALTH

As previously indicated in this report, there was established in Canada in 1919, under the provisions of the Dominion Health Act, a Department of Health. Subsequently, it was merged with Pensions. We desire to offer the following observations and suggestions with respect to the Department of Pensions and National Health:

There does not appear to us to be any logical connection between Pensions and National Health, although it is recognized that both are of great national importance. It appears to us that national health suffers through being linked with a large spending department which must of necessity absorb the major portion of the time of the Minister and his Deputy. A cursory examination of the finances of the Department would indicate that, in outlay, Pensions represents more than fifty times the amount expended in Health. National Health should be big enough and important enough to stand by itself. Should it, however, not be found feasible for it to enjoy individual status, it is most desirable, and indeed essential, that it be headed by a full time Deputy Minister who, through qualifications and administrative ability, is competent to give direction to one of the most important phases of Government.

We believe, further, that consideration should be given to the inclusion in National Health of Public Health and medical care services now provided by other departments in the Federal Government. We are not suggesting at the moment that all such services should be transferred to the Department of National Health, but we do recommend that a careful examination as to the propriety of their being so included should be made, and, unless there is found to be good reason to the contrary, it would appear to be desirable that all government health activities be incorporated in the Department of National Health.

MEDICAL CARE OF THE CASUAL AND CHRONIC UNEMPLOYED

No man, woman or child in Canada today need be deprived of food, fuel, shelter and clothing. The Dominion Government, by subsidy to the provinces, has established this as a definite national policy. It is true that, while this may be regarded as a relief measure, particularly during the past few years of severe economic depression with its consequent unemployment,—it may be argued without fear of contradiction, that, so far as Canada is concerned in the future (whether speaking national-

ly, provincially or municipally) the provision of food, fuel, shelter and clothing to those of our citizens who cannot provide these essentials for themselves, is assured.

But, for those same unfortunate people, another necessity of life which, in our judgment, is just as essential as food, fuel, shelter and clothing, is medical care; and yet, for this necessity the Federal Government has assumed no responsibility, and, therefore, the provision of medical care to the unemployed and the indigent is in some of the provinces entirely inadequate, if indeed not entirely absent, the recipients of general relief being dependent for medical care upon the charity of the medical profession. It does seem to us illogical to say to an unfortunate individual or family, the Government will provide you with a house and fuel to keep you warm, clothing to keep you covered, and food to sustain you, but, if you have the misfortune to become ill, then you must take your chances of living or dying, because so far as the Federal Government's responsibility goes it washes its hands of the whole matter. It, of course, has been argued that medical care of relief recipients is a responsibility for the municipality. Such an argument, while perhaps technically correct, does not meet the situation because many municipalities, particularly in Western Canada where economic conditions during the past several years have been deplorable, are just as unable to provide medical care for their people as they are to provide food, fuel, shelter and clothing. It is a well-established fact in several lands that disabling illness among persons who are unemployed and on relief is very much higher than among a similar number of persons gainfully employed. On humanitarian and economic grounds, medical care of the unfortunate citizens who cannot provide medical care for themselves because of unemployment or indigency should be clearly defined as an obligation of the State, and certainly not as an implied obligation of the medical profession. While it is our opinion that this obligation should be assumed by the Federal authorities, that is not so much our concern as that a definite decision should be arrived at with regard to where the responsibility lies, and that adequate provision should subsequently be made for medical care to be provided along with food, fuel, shelter and clothing.

Now, having stated the broad principle of responsibility, to whom should this apply? In our judgment the State should be responsible for the provision of medical services to the unemployed, the indigent, war veterans receiving Federal Department relief, war veterans on War Veterans' Allowances, old age pensioners, mothers and their children in receipt of Mothers' Allowances. We cannot believe that the Canadian public either expects or desires the medical profession to provide gratuitously for services which, obviously, are an obligation resting upon the State as a whole. Most respectfully do we suggest to this Royal Commission that, on the facts stated, it be recommended to the Federal Government that medical services for those referred to in this section of the report be made a responsibility of Government.

HEALTH INSURANCE

The world is looking for security. In order to achieve it, nations are uprooting old traditions and customs, overthrowing governments, spending billions of dollars, in fact doing everything and anything which in the opinion of those in authority will bring about something approaching an earthly Utopia where mankind may live in perfect peace and security. This quest envisages many changes, economic, social and political. Fortunate, indeed, is that country where sound thinking and leadership guide the people along the path of evolutionary changes, in contrast to the land where power and authority are the products of revolution. We are happy to think that we live in a land where sound thinking and statesmanlike leadership still prevail, and where those changes which may be necessary to provide better living conditions, greater protection, a proper share of the necessities and luxuries of life for all the people, will be the products of sound evolutionary progress.

In this forward march for social security there would appear to loom on the horizon a demand for health preservation which merits most earnest consideration. A great many people, both within and without the medical profession, are looking for a solution of the problem which will guarantee complete medical service to all the people on the principle of adequate payment for adequate service.

There are many students of sociology who claim that health insurance is the answer to the problem. The subject is one which has engaged the attention of the Canadian Medical Association for a number of years. Study committees representing all parts of Canada have had the subject under review most intensively. Our General Secretary, during the past year, visited several European countries expressly for the purpose of seeing health insurance in action.

Bismarck introduced health insurance into Germany in 1883. Lloyd George introduced health insurance into Great Britain in 1911. Health insurance is in operation in more than forty countries of the world, where benefits of proved value are available to middle-class persons. In considering the possibility of health insurance for Canada we find that there is no information available in our country at the present time showing—

(*a*) The feasibility or otherwise of establishing a national scheme of health insurance to provide adequate health services for those who cannot provide such services for themselves.

(*b*) Statistics of proved morbidity rates in the class of people who might be regarded as the population to be insured.

(*c*) The extent at the present time to which the class of people to be insured is inadequately served, due either to lack of available facilities or inability to pay for services.

On April 25 and 26, 1935, there assembled in Ottawa, under the Chairmanship of the Honourable Dr. Donald M. Sutherland, Minister of Pensions and National Health for Canada, the first meeting of the Ministers of Health for Canada, with the Ministers of all the provinces present or represented with the exception of Quebec. In addressing the conference, the Honourable Dr. Sutherland pointed out that it seemed to him that references to public health in the British North America Act were indeed vague. He spoke on public health at the time the British North America Act came into existence and compared it with the marvellous advances which had taken place between that time and the date of the conference. In further reviewing the activities of the Department of Health, he expressed the opinion that a worthwhile purpose would be served if a Royal Commission were appointed by the Dominion Government to make a survey of health matters in Canada. The Conference, in dealing with the proposal, received and passed unanimously the following resolution:

"WHEREAS the Honourable the Minister of Health for Canada has proposed to this Conference that a Royal Commission be appointed to examine into the whole question of medical services to the people of Canada;

AND WHEREAS such a Royal Commission would be in a position to secure information of great value to the people of Canada;

BE IT RESOLVED that this Conference approves of the suggestion of our Chairman that such a Royal Commission be appointed."

Subsequently, the Right Honourable R. B. Bennett, then Prime Minister of Canada, included in the speech from the throne a statement to the effect that the recommendation recited in the foregoing resolution would be implemented should his Government be returned to power. In the General Election of 1935, the Government was changed, and, to this date, no action has been taken on the recommendation.

At the Sixty-sixth Annual Meeting of the Canadian Medical Association, held conjointly with the American Medical Association in Atlantic City, N.J., June 10 to 14, 1935, the Canadian Association dealt with the subject of health insurance, and the following resolution was passed:

WHEREAS it has been brought to the attention of this Council that the Ministers of Health for Canada, meeting in Ottawa, proposed that a Royal Commission be appointed to make a survey of Canada in respect to the health services of Canada;

BE IT RESOLVED that this Council heartily approve of such a survey being made, and would recommend that the Commission be given the widest possible powers;

AND FURTHERMORE we respectfully submit that, before any scheme of health insurance be enacted in any part of Canada, it would be the part of wisdom to see that such a survey has previously been made.

There followed two additional resolutions which are recited hereunder:

1. That a copy of the above resolution be sent to the Provincial Medical Associations for their information, with a covering letter stating that, while the Canadian Medical Association has neither the desire nor the authority at this time to make any pronouncement for or against health insurance, Council feels that the above mentioned resolution would be of definite value to any part of Canada, as indicating the opinion of Council with regard to the principles underlying any possible plan of health insurance.

2. That the General Secretary be instructed to send a copy of the resolutions quoted above to the Honourable Minister of Health for Canada and to the Ministers of Health for the nine provinces.

It was further resolved as follows:

That, in the event of health insurance being initiated by any authority in any section or area of Canada the Canadian Medical Association endorse the principles governing a health insurance plan as laid down in the Report of the Committee on Economics, which we quote hereunder:

1. That in the provinces where health insurance is established it be administered under an independent Health Insurance Commission, and that there should be close cooperation between this Commission and the Provincial Department of Public Health, with a view to making full use of preventive services.

2. That a Central Health Insurance Board and Local Insurance Boards be appointed, representative of all interested to advise the responsible administrative authority.

3. That the professional side of Health Insurance Medical Service be the responsibility of the organized medical profession through the appointment of a Central Medical Services Committee and Local Medical Services Committees to consider and advise on all questions affecting the administration of the Medical benefit.

4. That the question of the establishment of local areas for health insurance administration be left to the decision of the individual provinces.

5. That the whole province be served by adequate Departments of Public Health, organized on the basis of provision of individual health supervision by the health insurance general practitioner.

6. That there be a Health Insurance Fund and that "Regional Officers", to act as supervisors and referees be appointed, paid and controlled by the Central Board or Commission.

7. That medical care for indigents be provided under the Plan, the government to pay the premiums of the indigent, who would then receive medical care under exactly the same conditions as the insured person.

8. That the Plan be compulsory for persons having an annual income below a level which upon investigation by competent local authorities proves to be insufficient to meet the costs of adequate medical care.

9. That the dependents of insured persons be eligible for the medical benefit.

10. That there be offered, on a voluntary basis, to those with incomes above the health insurance level, hospital care insurance, and that this be administered as part of the Health Insurance Plan, such hospital care

not to include medical service other than hospitalization.

11. That the only benefit under the Plan be the medical benefit.

12. That the medical benefit be organized as follows:—

(*a*) Every qualified licensed medical practitioner to be eligible to practise under the Plan.

(*b*) The insured person to have freedom of choice of medical practitioner and vice versa.

(*c*) The medical service to be based upon making available to all a general practitioner service for health supervision and the treatment of disease.

(*d*) Additional services to be secured *ordinarily* through the medical practitioner. (1) (*a*) Specialist medical service. (*b*) Consultant medical service. (2) Visiting-nurse service (in the home). (3) Hospital care. (4) Auxiliary services—usually in hospital. (5) Pharmaceutical service.

(*e*) Dental service, arranged direct with dentist or upon reference.

13. That the Insurance Fund should receive contributions from the insured, the employer of the insured and the government.

(*a*) Payment of the premium of the insured in certain proportions to be determined, should be made by the employee, employer and government.

(*b*) Where an insured person has not an employer or where it is not practical for the government to collect from the employer the government should pay in for that insured person what would be the employer's share as well as its own share of the premium.

(*c*) Where the insured is "indigent" or has been out of work long enough to come without the scope of the provisions of the Act as relating to an insured employee the government should assume payment of the full premium.

14. That the medical practitioners of each province be remunerated according to the method or methods of payment which they select.

15. (*a*) That the Schedule of Fees in any Health Insurance Scheme shall be the Schedule of Fees accepted by the organized profession in the province concerned.

(*b*) That all Schedules of Fees be under complete control of the organized medical profession in each province.

16. That the contract-salary service be limited to areas with a population insufficient to maintain a general practitioner in the area without additional support from the Insurance Fund.

17. That no economic barrier be imposed between doctor and patient.

18. That the volume of work demanded from and the remuneration to members of the various professions be such as to assure a standard of service equal to or better than present-day standards.

From the foregoing, the position of the Canadian Medical Association in respect to health insurance may be summarized as follows:

1. The Canadian Medical Association has not authorized an expression of opinion either in favour of, or opposed to, the institution of health insurance in Canada; but, in the event of some plan being proposed, the Association has set forth what it believes to be necessary guiding principles.

2. It is our opinion that, before health insurance is applied in any part of Canada, a survey, as recommended by the Honourable Minister of Pensions and National Health for Canada in 1935 and approved by the Conference of Ministers of Health from the several provinces, should first be carried out.

We are in a position to state that, should such a survey be undertaken, or should constituted authority engage in any other study looking to a solution of the problem of the provision of medical services to the people of Canada, the Canadian Medical Association will be happy to render to such bodies as may be entrusted with the examination of the facts, all the facilities at its command.

RECOMMENDATION

We hope that this Royal Commission on Dominion-Provincial Relations may find it within its jurisdiction to recommend that a survey be made, as proposed in 1935 by the Honourable Minister of Pensions and National Health for Canada, before health insurance is undertaken either as a Federal or a Provincial matter.

CONCLUSION

In conclusion, the Canadian Medical Association desires to express its appreciation to this Royal Commission for the privilege of presenting this brief. In company with the vast majority of Canadian people, it is our very sincere wish that the findings and recommendations of the Commission may be productive of subsequent legislation which will carry our country a step further towards the realization of the ideals of the Fathers of Confederation, that Canada should in truth be a nation.

All of which is respectfully submitted.

GEORGE S. YOUNG, *Chairman of General Council.*

T. C. ROUTLEY, *General Secretary.*

Hospital Service Department Notes

Group Hospitalization

One of the addresses at the recent convention of the American College of Surgeons of interest to hospital staff members was that of Dr. C. Rufus Rorem, the well known authority on periodic prepayment plans for hospital care, who reviewed a wide range of medical experience and opinion on this subject. Enquiries were addressed to doctors having actual experience with these plans. He found from an analysis of replies that the doctors were practically unanimous that the development of these plans whereby, for a stated monthly premium, hospitalization without charge would be provided, did not interfere with the relationship of or to the physician. Some stated that relation-

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

ships were improved, as more patients sought a private physician rather than enter the hospital on a free service.

There was some evidence of hastened recovery, due to lessened financial worries during hospitalization, and to earlier hospitalization with the removal of the cost factor. However, opinion varied. It seemed agreed that the quality of the service was unimpaired. With respect to the effect of these plans upon the collections of the doctors, opinion varied. Some thought that there had been no effect, while others were emphatic that the plans had increased medical collections because of the fact that, without a hospital bill facing the patient, it was much easier for the patient to pay the doctor.

Medical Societies

The Calgary Medical Society

At the regular monthly meeting of this Society, held on January 4th, the following program was presented: "The value of the intravenous urogram in urological diagnosis", Drs. W. S. Quint and F. Pilcher; "Some observations on fractures", Dr. D. S. Macnab; "A consideration of biological and psychological factors involved in the treatment of certain cases of pseudo-hermaphroditism", Dr. E. L. Holden Ellis; "Functional uterine bleeding", Dr. A. E. Wilson.

At a special meeting of the Calgary Medical Society held at the Holy Cross Hospital on January 25th, Dr. R. E. Buswell gave a most interesting address on a trip through Europe, "Six thousand miles by car", illustrated by movie films. This meeting was graced by the presence of members' wives. Supper was later served at the Glencoe Club.

Members of the Calgary Medical Society were invited to attend a meeting of the Young Men's Section of the Calgary Board of Trade on January 10th, to listen to an address of unusual interest by Colonel F. S. Dunn, Dean of the Department of Pharmacy at the University of Alberta, on "Chinese medicine". This was illustrated by numerous lantern slides. Colonel Dunn spent 1935 in China in research work in pharmacology.

G. E. LEARMONTH

The College of Physicians and Surgeons of Saskatchewan

At the annual meeting of the College of Physicians and Surgeons of Saskatchewan Dr. O. E. Rothwell, of Regina, was re-elected *President;* Dr. O. M. Irwin, Swift Current, was elected *Vice-president*; Dr. J. G. K. Lindsay, Saskatoon, re-elected *Registrar.*

An honorary life-membership, the sixth in the college's list, was awarded Dr. Horatio Clarence Norquay, recently of Battleford but now residing in Winnipeg. He registered in the North-West Territories in 1898.

The next annual meeting will be held in Prince Albert at a date to be fixed.

The council decided to extend post-graduate facilities by the purchase of a motion picture projector and provision of films for use by the district societies in the province. During the past year considerable funds were used in providing post-graduate tours by leading clinicians from outside the province.

LILLIAN A. CHASE

The Montreal Physiological Society

GASTRIN.—S. A. Komarov. (Abstract of a paper read on October 10, 1937).

From the pyloric mucosa of dogs preparations were isolated which, when injected intravenously, elicited a gastric secretion with high acidity and low pepsin content in acute experiments on cats. These preparations did not contain histamine, choline or any other extractives, were not toxic, did not exhibit histamine- or choline-like depressor activity, and had no effect on pancreatic secretion. Preparations isolated in a similar manner from fundic and also from intestinal mucosa were without any effect on gastric secretion. It is concluded that pyloric mucosa contains a specific hormone—gastrin—which excites gastric secretion. Gastrin is a protein-like body which in its general chemical properties resembles secretin.

SOME COMMENTS ON THE PLEURAL LYMPHATICS OF EXPERIMENTAL ANIMALS AND MAN.—Hugh E. Burke. (Abstract of a paper read January 17, 1938).

Small quantities (0.25 c.c.) of colloidal thorium dioxide and finely divided lamp black injected into the pleural spaces of guinea-pigs remain, in part, on the pleuræ, and are, in part, conveyed to the extra-pleural parasternal lymph nodes and the retro-peritoneal para-aortic lymph nodes. A few experiments in which tubercle bacilli in suspension in isotonic saline were injected intrapleurally indicate that tubercle bacilli are also transported to the parasternal and the para-aortic lymph nodes.

Rabbits injected intrapleurally with small quantities (0.25 or 0.5 c.c.) of colloidal thorium dioxide and finely divided lamp black show deposits of these materials on the pleuræ and in the parasternal lymph nodes. X-ray and necropsy examination of the rabbits failed to reveal thorium dioxide and lamp black in other tissues and organs.

Examination of human necropsy material shows that patients who did not have pleurisy have minute parasternal lymph nodes and that those who had pulmonary tuberculosis and widespread pleurisy frequently have large tuberculous parasternal and para-aortic lymph nodes. These findings indicate that in man tubercle bacilli are conveyed from the pleural spaces to the parasternal and the para-aortic lymph nodes.

Studies are in progress to determine whether or not the transfer of tubercle bacilli from the pleural spaces to the parasternal and the para-aortic lymph nodes plays a rôle in the pathogenesis of spontaneous cold abscesses of the chest wall and tuberculosis of the lower thoracic and upper lumbar vertebræ.

EFFECTS OF ESERINE, ACETYLCHOLINE AND ATROPINE ON THE ELECTROENCEPHALOGRAM.—F. R. Miller, G. W. Stavraky and G. A. Woonton. (Abstract of paper read on January 17, 1938).

One hundred gamma eserine in 1 per cent solution applied to the motor cortex of the cat in dial anæsthesia augments the frequency of the waves of the electroencephalogram, at the same time reducing their amplitude. These changes coincide with contralateral muscular effects. One hundred and twenty gamma acetylcholine in 1 per cent solution applied to the eserinized cortex increases slightly the frequency of the waves, while reducing their amplitude. Twenty-six gamma atropine in 0.1 per cent solution applied to the eserinized cortex evokes in the electroencephalogram periods of intense hyperactivity which are synchronous with periods of muscular contractions in the opposite shoulder and thigh. The effects of eserine are attributable to enhanced, those of atropine to diminished, transmission at synapses. The results may be interpreted in terms of the hypothesis of acetylcholine as chemical transmitter at synapses. It is also conceivable that there is some other opposed synaptic action of eserine and atropine.

The Prince Albert District Medical Society

At the annual meeting of this Society Dr. George B. Bigelow gave a paper on "Extrauterine pregnancy", with a report of a case. This paper appeared in the *Journal* (1938, 38: 174).

The following officers were elected for 1938: *Honorary President,* Dr. R. G. Scott, Wakaw; *President,* Dr. G. H. Lee, Prince Albert; *First Vice-president,* Dr. D. P. Miller, Prince Albert; *Second Vice-president,* Dr. Fahlman, Kinistino; *Secretary-treasurer,* Dr. E. A. Frejd, Prince Albert; *Executive,* Drs. D. G. MacQueen, Tisdale; B. H. Lyons, Birch Hills; G. B. Bigelow, Prince Albert, and I. C. Molony, Prince Albert.

The Saint John Medical Society

At the regular monthly meeting of this Society, Dr. C. W. McMillan, Local Medical Health Officer, delivered a very interesting paper on the recent epidemic of poliomyelitis. The speaker synopsized the literature of this disease as to history and symptomatology, and told of the research efforts made by a variety of investigators. He dealt with the various major epidemics, and outlined the special features of each, with the deductions which had been drawn by the medical groups who handled them. Dr. McMillan stated that the change in the definition of what constituted a reportable case has been partly responsible for the lowered case fatality rates of the more recent epidemics. For the same reason the case paralysis rates have shown a corresponding drop. It has been suggested that two epidemic diseases are occurring simultaneously, but coincidences repeated with such regularity appear unlikely. In the recent Saint John epidemic 67 per cent of the patients were under ten years, and one-third of the cases in the age-group five to nine; 55 per cent of these were in males.

Based on 112 cases selected for this analysis, the incidence rate was high, namely, 190 per 100,000 population. Of all homes involved 15 per cent had more than one case reported. In some of our cases (one-sixth of the total), where spinal puncture was done early, there was an increase in globulin only. Later, lumbar punctures in these same cases showed an increase in the cell-count. Seventy-five per cent of cases showed spinal fluid changes; 60 per cent showed changes in cells and globulin, and 15 per cent in globulin only.

Control measures consisted in prompt treatment of cases with immune serum, hospitalization, and complete rest. Surgical staffs controlled the cases with paralysis or paresis. The usual technique was employed for the care of communicable diseases. No hospital staff member became infected. Houses, where a case developed, were quarantined for two weeks; children were banned from school and public gatherings by proclamation.

Serum was given intramuscularly in 25 c.c. doses. In no case was this dose repeated. The serum was prepared in the Provincial Laboratory by Dr. R. A. H. Mackeen. There was no shortage of serum, due to the eagerness and readiness with which donors offered their blood. This local supply assured the freshness of the serum at all times. Twenty-seven per cent of the patients received serum within twelve hours of the onset of symptoms; 65 per cent within twenty-four hours; and 82 within forty-eight hours; only 18 per cent after forty-eight hours. The Department of Health knew of no contraindication to the use of serum, and as

there was no alternative treatment the Department recommended its use. The interval of time elapsing before administration of serum bears a definite relationship to the percentage making a complete recovery. In the Saint John epidemic group the paralysis rate was 12.5 per cent; the residual paralysis rate was 2 per cent, and eventually may be 1 per cent. Dr. McMillan commended the cooperation of the Medical Society, hospital staffs, Laboratory, donors and Health Officers, as an evidence of effective team work.

A. STANLEY KIRKLAND

The Saskatoon District Medical Society

This Society held its annual meeting on January 25, 1938, at the new quarters of the School of Medical Sciences, University of Saskatchewan. After dinner at Saskatchewan Hall the business meeting took place in the lecture room. The new officers for 1938 are: *President*, Dr. W. S. Holmes; *Vice-president*, Dr. B. R. Burwash; *Secretary-treasurer*, Dr. L. Schulman; *Executive Committee*, Drs. G. M. T. Hazen, H. E. Alexander, R. H. MacDonald.

Dr. W. S. Lindsay, Dean of the Faculty of Medicine, gave a summary of the activities of the School, which was followed by demonstrations by Dr. J. L. Jackson, Professor of Anatomy, and Dr. J. Fiddes, Professor of Physiology. The School accepts only twenty-four new registrants each year, selected from those having highest standing in the pre-medical course.

LILLIAN A. CHASE

University Notes

McGill University

The Board of Governors of McGill University announced the following appointments in Medicine on January 20, 1938.

Dr. A. T. Bazin, Professor of Surgery, becomes Head of the Department of Surgery.

Lecturer in bacteriology and immunology, C. D. Kelly, M.S.A., Ph.D.

Demonstrators in anatomy: F. S. Dorrance, M.D., C.M.; G. A. Holland, M.D., C.M.; W. J. Lafave, B.Sc., M.D., C.M.; Harry S. Morton, B.A., M.B., B.S., F.R.C.S., M.C.O.G.

Demonstrator in bacteriology and immunology: W. Gordon Stewart, B.A., M.D. Demonstrator in pharmacology and therapeutics: J. O. W. Brabander, M.D., C.M. Demonstrator in pathology: F. W. Grauer, B.S.A., M.D., C.M.

Demonstrators in medicine: Charles S. Baker, B.A., M.D., C.M.; William Cohen, M.D., C.M.; Louis Lowenstein, B.A., M.D.; S. Ortenberg, M.D., C.M.; J. M. Palmer, M.D., C.M., M.R.C.P.; Clifford Smith, M.D., C.M.

Other appointments were: Mrs. Eleanor H. Venning, M.Sc., Ph.D., Research Fellow, medical clinic; Mary Childs, M.D., C.M., medical officer for women.

Letters, Notes and Queries

St. Lawrence Fever

To the Editor:

In reference to Dr. H. E. MacDermot's note on "St. Lawrence Fever", which appeared in the November issue of the *Canadian Medical Association Journal*. We are indebted to Dr. MacDermot for having brought this matter to our attention in his usual accurate and pleasing style, and I cannot refrain from expressing thanks and also respectfully discussing this subject as it has been my lot to usually spend a part of the summer in the Lower St. Lawrence. I have therefore experienced this disease as a patient, and observed it as a physician for a good many years.

I cannot agree that the attacks are always recovered from within 48 hours, and it has seemed to me that some summers they were much more severe. I have seen this disease infect every person in a household of adults and children, and have had patients ill for two weeks with diarrhœa. My experience has been on the north shore, and in the Murray Bay environs, but I have also seen what I regarded as a similar disease in mountain resorts in the Laurentians. To me, clinically, this disease has been "bacillary dysentery", the severity of the symptoms depending upon which strain was present, for it is well known that while the Shiga and Flexner group cause the most pronounced symptoms there are a dozen other varieties such as the Hiss, Russell, Strong, Morgan, Sonne, etc., which cause mild attacks of dysentery. The organism gains access to the body by means of the gastro-intestinal tract, contaminated milk and water being the most frequent sources of infection; and the ordinary house-fly probably the most frequent cause of contamination. Cases occur, as a rule, during July, August and September; do not seem to be associated particularly with hot weather, but invariably are encountered at the time of year when the house-fly is abounding in swarms and the privies are full of fæces, which is often untreated and unprotected. It is easy to visualize the common house-fly in its purposeless peregrinations infecting small berries, such as raspberries and blueberries which are consumed with such relish by summer visitors; or another

Answers to letters appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

source of contamination of these berries might be the not-too-clean French-Canadian child who often gathers and sells the berries.

During the last few years, with the boiling of the milk and water and stewing of all fruits consumed, except those capable of being peeled, and a careful protection of all foods from the common house-fly, the disease has been strikingly reduced in those families which have followed this advice.

The scientific proof that "St. Lawrence Fever" is in reality a form of bacillary dysentery will be difficult to establish without laboratory or hospital facilities, but the therapeutic results obtained have convinced me that sudden changes of temperature have very little to do with its occurrence, and the often astounding rapidity of cure might be ascribed to a suitable climate and low virulence of the organism.

Montreal, Que., HENRY P. WRIGHT.
December 16, 1937.

The Ill Effects of Dorsal Decubitus During the Puerperium

To the Editor:

For some time I have intended to draw attention to what seems to me to be a serious fault in our aftercare of puerperal patients. Some years ago I began the practice of routine examination of all mothers at the sixth week after confinement. I was surprised at the number showing poor position of the uterus and at the number of cases in which I had to do an actual reposition. No results were obtained from trying manual reposition in the knee-chest position. Finally no time was wasted, but at once ether was given, and with a large blunt sound I levered the uterus into position, packed the vagina with gauze, and kept the patient in bed four days. In nearly all cases this correction was permanent and the uterus remained in its proper position.

About two years ago it occurred to me that the cause of this displacement is one error and only one, namely, dorsal decubitus while the uterus is large and heavy with, in all probability, the bladder doing some harm by being allowed to overfill. I know it is the common practice to have these patients shift position frequently, but I am convinced that they should not lie on the back at all until involution is complete. The human animal is the only mammal which uses the dorsal decubitus, and so far as we know the human animal is the only one which suffers from backward displacement of the uterus. The other mammals use the prone and right and left lateral prone positions only, and I am sure this fact has a vital bearing on the matter. The great sloth spends practically his whole life hanging upside down from the branches of trees, but I do not know what the female sloth does during her puerperium. It would be interesting to know to what extent the position of the uterus in this species has been changed during the evolution of this strange creature. One would expect the uterus to be retroverted by force of gravity during the perpetual dorsal position.

Since absolutely prohibiting use of the dorsal position and seeing that the bladder is emptied every six hours during the first four days I have not seen one backwardly displaced uterus requiring reposition in two years. I am thoroughly convinced that this displacement need never occur as a sequel to parturition. Once the reasons are clearly stated to the mother one can usually depend on her complete cooperation.

A. H. SINGLETON.

Rouleau, Sask.

The Surgical Thimble

To the Editor:

Surgeons are often asked, "Why do you not use a thimble?" To my tailor I replied, "Most of the time it would not be practical as a needle-holder is necessary in surgery".

Speaking of thimbles, may I recall that in 1921 I saw Wm. Mayo manipulating with skill, a thimble.

If the needle were shorter the handling of a thimble would be facilitated: we all know that tailors always sew with short needles. I suggest that the thimble would aid speed and precision in: (*a*) intestinal work; the needle should be fine, straight, tapered and short (one and one-quarter inches), with atraumatic eye; (*b*) skin stitching, in face, goitre and even abdominal closure; the needle should be of medium weight, straight, cutting and short (one and one-quarter inches), with atraumatic eye.

J. BOULANGER.

Edmonton, Alta.,
December 30, 1937.

APHORISMS FROM LAVATER

Actions, looks, words, steps, form the alphabet by which you may spell characters.

He who reforms himself has done more towards reforming the public than a crowd of noisy, impotent patriots.

Where there is much pretension much has been borrowed; nature never pretends.

Trust him little who praises all, him less who censures all, and him least who is indifferent about all.

Abstracts from Current Literature

Medicine

Weil's Disease. Report on Seven Cases. Gaines, A. R. and Johnson, R. P.: *Arch. Int. Med.*, 1937, 6: 816.

The generally accepted conception of this condition has been too vague, since it is a definite entity with a known cause — rat infestation with *Leptospira ictcro-hæmorrhagica* leading to human contraction of the disease. Clinically, there are three stages: (1) a febrile stage, seven days, with chills, intestinal upset, albuminuria, and other signs of acute infectious disease; (2) an icteric stage, seven days, with jaundice, cardiac weakness; (3) a convalescent stage, with anæmia and emaciation. Leptospira is present in the blood early, usually thinning out during the second week as antibodies come into action. During the third stage the organism is excreted in the urine in large numbers, also at this time a transient recurrence of fever is often noticed, cause unknown. Pathologically, there is inflammation of the duodenum around the ampulla of Vater; frequently closure of the common duct above its opening into the duodenum; liver reaction, varying from slight leucocytic infiltration to actual necrosis; and some congestive swelling of the kidney. Skeletal muscles sometimes show hyaline degeneration and necrosis. Hæmorrhages may be found in the lungs and other tissues, including the adrenals. The authors feel that this disease should be kept in mind in every case of jaundice not completely explained. Diagnosis must be based on either demonstration of the organism in the blood by dark-field examination, the same in the urine, the guinea pig test, or the demonstration of the presence of antibodies, especially the first two. Prophylactic treatment with immune horse serum has proved successful. Convalescent serum and immunized horse and goat serum are useful during the active stage. In spite of the fear of liver damage arsenical preparations have had a good effect in removing the Leptospira from the blood. Five cases are reported.

P. M. MACDONNELL

Hydatid Disease. Godfrey, M. F.: *Arch. Int. Med.*, 1937, 60: 783.

Found chiefly in countries where sheep are raised, since they are the intermediary hosts, sheep viscera are fed to dogs who contaminate pastures and water supplies. Iceland, Algiers, Bulgaria and many other countries have this disease as a problem, and more recently the situation has become very serious in Argentina and Uruguay, where the sheep industry has increased rapidly, and the labourers are unaware of the seriousness of the disease.

In man the liver is more often the seat of the disease than all the other organs together. The manifestations include dyspnœa and upper abdominal tumour, reaction to the escape of the fluid content as shown by urticarial rash, and sometimes fever, dyspnœa, collapse, and even death, if the fluid enters the blood stream.

The diagnosis is made by laboratory methods. The x-ray, also, has made accurate diagnosis possible in a great many cases; when a cyst dies the deposit of calcium can be brought out, also the presence of any quantity of fluid. In the liver where the right lobe is usually the seat of trouble x-ray shows elevation of the diaphragm with segmentation of its contour. The differential diagnosis is from hepatic abscess, malignancy, portal cirrhosis, syphilis and diaphragmatic adhesions.

The lung comes next in order of frequency. The usual cause is hexacanth embryoes carried, more frequently, to the right lung. Their expansion may lead to the occlusion of a bronchus or there may be an opening into the bronchus through which the contents of the cyst drain. "Daughter" cysts may look like grape skins when coughed up. Subpleural cysts may require surgery. Differential diagnosis is from carcinoma, sarcoma, abscess, interlobar empyema, infarct, dermoid cysts, tetrosternal thyroid.

The other organs, kidney, spleen, bowel, brain, peritoneum and heart are also discussed, although they are seldom involved. The treatment by needling and surgical methods is mentioned.

P. M. MACDONNELL

Inheritance of the Shaking Palsy. Allan, W.: *Arch. Int. Med.*, 1937, 60: 425.

Only about a dozen families in which paralysis agitans appeared to be inherited have been reported in the literature. Allan examined 72 consecutive patients with this disease, and found that in 7 there was a history of probable encephalitis to account for it; in 20 there was nothing in the history to suggest its cause; and in 45 there was a history of near relatives with the disorder. In 24 of these the family history was fairly complete, and these pedigrees are given in the paper. Three men were affected to each two women. In several instances men and women with paralysis agitans have married twice, each time to unaffected partners, and have passed on to both sets of children their disease.

One of the pedigrees may be mentioned specifically. A man who left Scotland to settle in North Carolina married twice. By his first marriage he had 3 affected descendants in the next two generations. Eight times his normal descendants married partners who had paralysis agitans; in 7 of these marriages the

affected partner was a cousin. Six of these marriages produced affected offspring. By the second marriage of this Scotchman he had an affected son who also married twice. By the first marriage, this son had 8 affected descendants, and by the second, 15 affected descendants. In no instance in this pedigree was there a skipping of generations by the defect; the line of descent was always direct from parent to child.

In some of the pedigrees there is a skipping of generations, so that an unaffected person has passed on the disease to the children. But in practically all of these instances the parent who was free and passed it on died before the age of 50, so that had he or she lived, the disease would probably have shown up. In only 2 cases was the free parent who passed on the defect past the age of 50; 54, in one instance and 56 in the other. As shown by Patrick and Levy's table, only 45 per cent of paralysis agitans cases are affected below 50 years; 33 per cent between 50 and 60; 19 per cent between 60 and 70 and about 3 per cent between 70 and 80. Therefore, the pedigrees offered by Allan would suggest that the disease is due to a dominant factor, and that men and women transmit it about equally to both sexes.

MADGE THURLOW MACKLIN

Surgery

Malignant Tumours of Meckel's Diverticulum. Nygaard, K. K. and Walters, W.: *Arch. Surg.*, 1937, 35: 1159.

The authors report a case of a malignant tumour of Meckel's diverticulum and review the literature on this subject. In the survey they found a total of 20 cases of this condition, 6 cases of carcinoma, and 14 of sarcoma. Of particular interest to pathologists was a patient with an adenocarcinoma growing in a tumour of heterotopic gastric mucosa. If this patient had continued to live without an operation, it would have, according to Gray and Kernohan, been only a question of time before the carcinoma had infiltrated the entire heterotopic gastric mucosa and left no trace of its origin in this tissue. A malignant tumour of Meckel's diverticulum may be present, for a time at least, without producing any clinical symptoms. When symptoms appear they fall into two main groups: (1) primary symptoms referable to the presence of the tumour; and (2) secondary symptoms referable to the perforation of the diverticulum, leading to localized or diffuse peritonitis or to invagination of the tumour together with the diverticulum.

Nygaard and Walter's patient, a man of 62 years, had a leiomyosarcoma of Meckel's diverticulum. He made a good recovery following the operation.

G. E. LEARMONTH

Discharge from the Nipple. Hicken, N. F. *et al.*: *Arch. Surg.*, 1937, 35: 1079.

An abnormal discharge from the nipple of a non-lactating breast is indicative of a pathological change within the ductal and secretory systems, yet it affords but scant information concerning the provocative factor. Conditions which produce confusing discharges fail to establish physical signs. All pathological conditions associated with a discharge from the breast must of necessity originate within or secondarily involve the ductal system. Any procedure which actually visualizes the lactiferous ducts should possess considerable diagnostic value. The authors present a method for visualizing the breast by means of contrast roentgenograms. A radio-opaque material, such as stabilized thorium dioxide, is introduced into the milk ducts by cannulating their orifices with a blunt No. 26 gauge needle. Stereoscopic roentgenograms then give an accurate anatomical pattern of the ducts. Any abnormalities, such as alterations in the size, shape or conformation of these ducts, can be detected readily and the causative agent identified. They have had experience with more than 375 contrast mammograms which has clearly demonstrated that they are invaluable in the diagnosis of lesions of the breast.

G. E. LEARMONTH

Fractures in Children. Bisgard, J. D. and Martenson, M.: *Surg., Gyn. & Obst.*, 1937, 65: 464.

This paper is chiefly concerned with disorders of the epiphyseal cartilages. These may be generalized, as in nutritional and vitamin deficiency and in abnormal functioning of the internal secretory glands, or they may be localized as a result of injury. In the latter case growth occurs in direct proportion to the vascular supply, although neurogenic and catabolic factors have direct effects. Arrest of growth results in shortening of the injured extremity, rotation and deviation from the normal plane of the joint surface. Trauma in reduction, infection, and fixation carried across the epiphyseal line are to be avoided. In this series deformities of clinical importance developed in 2.5 per cent of those under 16 years; these represent 12 per cent of those in whom the epiphyseal cartilage was involved, despite the fact that x-rays showed that 50 per cent of the cases failed to resume normal growth or manifested premature fusion of the epiphysis. Most of them needed no correction. A few were corrected by orthopædic appliances, and the more severe by operative measures. The authors do not offer any other measures than those generally used for such deformities. Experimental work on goats is cited to substantiate their claims.

FRANK DORRANCE

Peritoneoscopy. Ruddock, J. C.: *Surg., Gyn. & Obst.*, 1937, 65: 623.

Despite the fact that this measure of chiefly diagnostic value has been available for 35 years it has not taken a place warranted by its importance, its low mortality rate (0.2 per cent), and its low cost in loss of time and hospitalization.

The author gives in detail his technique for operation. Distension of the peritoneal cavity was obtained by the use of atmospheric air. He insists on an operating table on which safe and easily changeable positions may be obtained. He finds an extensive knowledge of gross pathology is necessary for his speciality. Peritoneoscopy can be used frequently to replace diagnostic laparotomy, particularly in chronic abdominal cases of pelvic, stomach, liver malignancy, post-operative adhesions, and suspected neurosis with lessened accentuation of symptoms. Ruddock has obtained a diagnostic accuracy of 91.7 per cent in comparison with a clinical accuracy of 63.9 per cent. In 500 cases there were 9 accidents as a direct result; 8 of these were punctures of the bowel by needle or trocar all of whom recovered after operation, with one fatality from biopsy of a malignant condition of the liver. FRANK DORRANCE

Hæmorrhagic or Traumatic Cysts of Mandible. Ivy, R. H. and Curtis, L.: *Surg., Gyn. & Obst.*, 1937, 65: 640.

The majority of cysts of the mandible are lined with epithelium. The authors report 5 cases of cyst with no lining epithelium, following upon trauma insufficient to produce fracture but sufficient to produce hæmorrhage along the inferior dental canal with subsequent bony absorption. Dull pain and slight to moderate swelling of the mandible are sufficient to warrant x-ray examination. Aspiration of the contents might suffice, but wide opening and evacuation are diagnostic as well as curative.
FRANK DORRANCE

Obstetrics and Gynæcology

Heart Disease in Pregnancy. Lamb, A. E.: *Am. J. Obst. & Gyn.*, 1937, 34: 456.

The use of the functional classification for cardiac cases as the only guide as to whether women undergoing pregnancy will be able to withstand the strain of gestation and labour is not adequate. Other factors have to be considered, namely, the size of the heart, the presence of a long rumbling diastolic murmur at the apex in mitral stenosis, the signs of rheumatic activity, auricular fibrillation, and the duration of rheumatic heart disease. Only if each case is individualized and all the factors considered can an accurate estimation of the risk entailed be obtained. ROSS MITCHELL

An Analysis of Three Hundred Consecutive Cases of Primary Cervical Repair. Wood, G. A.: *Am. J. Obst. & Gyn.*, 1937, 34: 606.

Primary cervical repair should not be practised unless one has obtained some experience in this type of surgery. This experience is not difficult to acquire. Strict asepsis is of prime importance, and only hospital equipment can provide this. Primary repair of the cervix is one more procedure in the practice of obstetrics that raises that practice to an art. Primary cervical repair offers a safe time-saving method of correcting or decreasing cervical lesions resulting from childbirth. ROSS MITCHELL

The Conservative Treatment of Premature Separation of the Normally Implanted Placenta. Irving, F. C.: *Am. J. Obst. & Gyn.*, 1937, 34: 881.

Three hundred and fifty-three cases of premature separation of the placenta are reported; of these 234 had external and 119 internal hæmorrhage. In 170 patients delivered through the pelvis by simple means there were no deaths. In 30 cases of external hæmorrhage treated by Cæsarean section the death rate was 3.3 per cent; in 69 cases of internal hæmorrhage delivered by Cæsarean section the death rate was 14.5 per cent; in 34 cases of internal hæmorrhage treated by conservative measures the mortality was 2.9 per cent. Conservative measures give a better prognosis for the mother in both types of premature separation of the placenta. ROSS MITCHELL

The Oral Administration of Paraldehyde for Relief of Pain During Labour. DeCosta, E. J. and Reis, R. A.: *Am. J. Obst. & Gyn.*, 1937, 34: 448.

Paraldehyde given in small doses of 4 c.c. every hour in gelatin capsules does not render the patient amnesic, is sometimes mildly analgesic, but is definitely sedative. In these doses it does not cause restlessness and seems to expedite delivery. As far as is known, paraldehyde is absolutely safe to the parturient patient and fetus in the varying doses used in this study. ROSS MITCHELL

Biologic and Clinical Import of Vulvovaginal Mycoses. Hesseltine, H. C.: *Am. J. Obst. & Gyn.*, 1937, 34: 855.

A method requiring fewer office visits for treating vaginal mycosis is described. The vagina is painted with diluted Lugol's solution once a week, and the patient inserts two capsules containing potassium iodide and potassium iodate diluted with neutral kaolin. The term "diabetic vulvitis" is incorrect, since the condition is apparently a mycotic infection, and it is suggested that "mycotic vulvitis" or

"fungous vulvitis" be used instead. Glucose as such causes no irritation but produces a more favourable medium for the monilia and cryptococci. Every patient with mycotic vulvitis should be examined for diabetes mellitus, and every diabetic patient with vulvar symptoms should be examined for mycotic infection.

The similarity of certain stages of mycotic vulvitis to kraurosis is mentioned. It is suggested that the fungi produce the precipitating factor extrinsically for the tissue reaction, while in such diseases as kraurosis it may possibly be intrinsically liberated.

ROSS MITCHELL

Ophthalmology

Chalazion, its Real Nature and Association with Ametropia. Robert, G.: *Ann. d'Ocul.*, 1937, 174: 473.

In a recent article on this subject, Dr. Solignac mentioned that in 1933 Robert had drawn attention to the influence of ametropia on the development of chalazion. Since the publication of this article Robert has had time to verify statements made then, and he has arrived at the following conclusions.

The chalazion is a retention cyst, appearing always in eyes which show even slight ametropia. Even though large it will disappear in nearly all cases after a period of varying length, if we correct the ametropia. The chalazion should be cured by optical and medical treatment. It is not an organic tumour. The deformities and modifications of the secretory cells are not surprising when we consider the phenomenon of retention.

S. HANFORD MCKEE

The Prescribing of Prisms in Current Practice. Hudelo, A.: *Ann. d'Ocul.*, 1937, 174: 528.

Ophthalmologists of different countries have studied from time to time the problem of heterophoria, that is, the subjective disturbance in the convergence-divergence function. In the last few years many authors, American, German, and particularly Landolt in France, have specially studied the question from both a theoretical and practical angle.

Hudelo takes up (1) what class of patients will benefit from this clinical examination; (2) the measurement of the convergent-divergent function, principles, technique and results; (3) clinical deductions; and (4) the result of examinations. Of 73 subjects studied 32 were troubled with convergent-divergent function for whom no prisms were prescribed; 7 were cured by prisms; 8 have not been seen again; 4 have had no relief; 17 have not been relieved by prisms, and this for various reasons. The treatment of emmetropia or slight ametropia is then taken up, and replies are given to certain possible objections.

S. HANFORD MCKEE

Ocular Symptoms in Olfactory Meningiomas. Hartman, E., David, M. and Desvignes, P.: *Ann d'Ocul.*, 1937, 174: 505.

This article is based on the study of 16 cases which were all examined and followed in the service of Clovis Vincent. In all cases the diagnosis was verified by means of the microscope. In Vincent's service olfactory meningiomas represented about 13 per cent of the total number. Ocular disturbances form the most important symptoms of these. Their presence was noted in each of these 16 cases. They may be divided into alterations in the fundus of the eye, such as bilateral papillary stasis, 8 cases; primary bilateral optic atrophy, 3 cases; papillary stasis of one side, with œdema of the edges with papillary discoloration of the other side, 2 cases; normal eye, 1 case. The syndrome of Foster Kennedy was not noted in any case, but in 2 a variation of this was observed.

Section 11 takes up visual clearness, which is again subdivided into loss of visual clearness with ophthalmoscopic lesions; visual clearness and papillary stasis; and visual clearness in the Kennedy syndrome. Then are discussed in order, III, the visual field; IV, exophthalmos; V, the pupillary reaction; VI, corneal sensibility, and, VII, globe motility.

The author takes up the post-operative evolution of ocular symptoms, and in discussing the diagnosis states that the ocular symptoms here present may be observed in the course of other affections, particularly with certain meningiomas of the small wing of the sphenoid, tuberculous meningiomas of the sella, hypophysis tumours, gliomas of the chiasma, and ventricular distension.

S. HANFORD MCKEE

Urology

Some Observations on the Renal Capsule. Rolnick, H. C.: *J. Urol.*, 1937, 38: 421.

The renal capsule, unlike the capsule of other parenchymatous organs, is somewhat loosely but securely attached to the kidney parenchyma, and decapsulation can be performed without injury to the organ. The elastic fibro-muscular structure of the capsule permits it to accommodate itself rapidly to variations in size which may occur as a result of intrarenal tension. This elasticity and tensile strength are probably factors in preventing injury to the kidney. It has been demonstrated experimentally that where extensive trauma has been exerted upon the kidney the capsule often remains intact although the parenchyma may have been fractured. The capsule is a barrier to the spread of infection to and from the kidney. In infections involving the retroperitoneal space the perirenal capsule may be invaded and destroyed, but the true capsule remains intact and walls

off the kidney. Reference is made to personal experimentation which proves that there is a constant interchange of fluid on the kidney surface, provided by the extensive lymph channels. Besides many other functions this serves to provide a plane of cleavage between the capsule and the kidney. Decapsulation is to be considered harmful to the kidney. The new capsule consists of scar tissue only, which results in complete loss of the normal physiological function. J. V. BERRY

Traumatic Injuries of the Bladder. Stevens, A. R. and Delzell, W. R.: *J. Urol.*, 1937, 38: 475.

While traumatic injuries of the bladder are not common, the subject has commanded attention in the literature from the days of Hippocrates. Bladder injuries are divided in two groups—ruptures due to blows or falls or compression, and perforations from without or from within the bladder. The commonest etiological factor is the overdistended bladder associated with injury, and the increase in hydrostatic pressure causes rupture in an explosive fashion. Alcoholism is probably the commonest associated factor. The empty bladder is fairly immune, except in instances where a spicule of bone, a bullet, knife or urethral instrument pierces the wall of the viscus. Spontaneous ruptures are reported where the wall is badly diseased. Rupture has occurred from explosion of gas during a transurethral resection of the prostate.

The diagnosis and treatment are rendered particularly difficult because of the frequent lack of history and outward evidences of trauma and the common association of other injuries.

The symptoms usually presented are low abdominal pain, inability to void, localized tenderness over the suprapubic region, and varying degrees of shock. Catheterization reveals bloody urine, and irrigation fluid usually cannot be recovered. Many symptoms may however obscure a ruptured bladder because of associated lesions to the bowel, pelvic bones, etc. The clinical signs and special methods of diagnosis are discussed. J. V. BERRY

Neurology and Psychiatry

Extradural Hæmorrhage. Verbrugghen, A.: *Am. J. Surg.*, 1937, 37: 275.

The classical syndrome of extradural hæmorrhage is characterized by violence to the head with unconsciousness, followed by a return to consciousness for a few hours, and a subsequent return to unconsciousness. In a large percentage of cases, however, the classical syndrome does not appear, being masked by injuries to the underlying brain. It is probable that almost 50 per cent of massive middle meningeal hæmorrhages are overlooked on this account. When the signs of developing extradural clot are obscured by injuries to the brain the gradual onset of hemiplegia with deepening coma and enlargement of the pupil on the suspected side are reliable guides. The behaviour of the person with an oncoming extradural hæmorrhage may be peculiar, in that he may seem confused, even violent, and he may have taken a drink or two to fortify himself. The unintelligible mutterings of an aphasic person who smells strongly of alcohol may easily lead to a mistaken diagnosis of "alcoholic" psychosis. The middle meningeal artery and its branches are by no means always the source of the bleeding, as more often the more vulnerable meningeal veins or cranial venous sinuses are its source. In some cases arterial bleeding may be so severe and the bleeding point deep and so inaccessible that it is necessary to ligate the external carotid artery in the neck. In cases where the diagnosis is in doubt a burr hole in the temporal region under local anæsthesia is not dangerous to the patient, and determines the presence or absence of an operable condition. FRANK TURNBULL

Observations on a Case of Familial Periodic Paralysis. Aitken, R. S. and others: *Clinical Science*, 1937, 3: 47.

Periodic paralysis affecting many persons in a family has been known for some time. The paralysis usually comes on during sleep, and gradually passes off in a few days. It was thought to be occasioned by the eating of particular foods in some patients. The patient investigated by Aitken and his co-workers gave a history of a grandfather and father affected with the same condition. He associated the attacks with having eaten heartily, and so attacks were induced in him at will by the administration of large amounts of glucose. Investigation of the blood chemistry showed that during these attacks the blood serum potassium fell to very low levels. This value is normally lowered when large amounts of glucose are administered by mouth and the glucose passes from the blood into the tissues. The lowering was particularly accentuated in this patient with periodic paralysis. The patient could be brought out of the attack by the administration of potassium chloride until the blood potassium rose above 12 mg. per 100 c.c. of blood. It is supposed that the lowering of the potassium content blocks the neuro-muscular junction or inhibits the contractile response in the muscles affected.

Hereditary differences in metabolism are being added to, as chemical investigations are made on patients suffering from various diseases. Periodic paralysis, at least in the patient referred to, is added to this group of

metabolic anomalies. The treatment in the case reported gave striking relief of the symptoms.

MADGE THURLOW MACKLIN

Dermatology

Effects of Cholesterol in Petrolatum on Loss of Water by the Skin and on Cleansing. Jones, K. K. and Murray, D. E.: *Arch. Dermat. & Syph.*, 1937, 36: 119.

For persons whose skin is sensitive to soap and water some form of oil is the only means of cleansing. This is often the case in certain skin disorders and under conditions where excessive dryness or the necessity of frequent cleansing prevails. Cholesterol has a stabilizing effect on the emulsions present in skin, and this action tends to render the skin more or less impermeable to water. Petrolatum being bland and inert is particularly useful for protecting the skin from water and air. With cholesterol it can readily be emulsified even at an acid reaction.

One of the most important and readily measurable functions of the skin is the regulation of the body temperature through loss of water. The authors devised an ingenious apparatus for making comparative measurements of the loss during the use of petrolatum and other compounds, as well as their penetrating and detergent effects. From the results it was evident that when mixed in proper proportions cholesterol in petrolatum reduced the effect of petrolatum by decreasing loss of water from the skin and allowed more intimate contact with the cutaneous tissue, thus making the skin more penetrable and more easily cleansed. The proportions of the mixture were found to be important, the ideal being cholesterol in the proportion of 1.5 to 2 per cent. With 2 per cent cholesterol the mixture increased the cleansing efficiency of petrolatum by 1,200 per cent, and penetration was increased by 33 per cent.

D. E. H. CLEVELAND

Therapeutics

The Conservative Treatment of Gall-bladder Disease. Mock, H. E., Brown, C. F. G. and Dolkart, R. E.: *Surg., Gyn. & Obst.*, 1938, 66: 79.

With 850 patients complaining of upper abdominal distress the authors found that 28 per cent suffered with disease of the gall-bladder. They give statistics of other authors from 1,823 patients operated upon with unsatisfactory results in 30 per cent. The authors make a plea for more conservative treatment of gall-bladder disease, with and without stones. There are 5 fundamental conditions which demand consideration in the management of a case. These are: (1) stasis in the biliary tract; (2) infection; (3) the varying degrees of hepatitis accompanying the changes in the gall-bladder; (4) pericholecystitis with adhesions; (5) accompanying pancreatitis. They suggest a medical regimen of hourly feedings of milk and cream, to induce contraction of the gall-bladder; ketocholanic acid (the authors used that of G. D. Searle and Co.) to stimulate flow of bile from the liver; and the antispasmodics—Tr. Belladonnæ, minims 8, with phenobarbital, grs. ½, 3 times daily. Rest in bed was often advisable. They advise medical treatment in gall-bladder dyskinesia, chronic cholecystitis without stones, and chronic cholecystitis with large, soft stones where attacks of colicky pains are infrequent. The authors urge consideration of cholecystostomy in cholecystitis with pancreatitis, with drainage for 6 to 12 weeks, in cholecystitis with cholesterol stones with a sound gall-bladder wall, and empyema of the gall bladder.

FRANK DORRANCE

Pathology and Experimental Medicine

Rôle of the Arteries in the Peripheral Resistance of Hypertension and Related States. Oppenheimer, E. T. and Priuzmetal, M.: *Arch. Int. Med.*, 1937, 60: 772.

This is an effort to discover whether changes in the arteries or arterioles are the cause of increased resistance in the condition named. The gradient of pressure from large to small arteries is investigated, the hypothesis being that a steep gradient in the systolic pressure would make the larger vessels responsible, and a reduced or normal gradient would put the blame on the smaller arteries. The pressures of the brachial artery and a digital artery were compared, a cuff (Gärtner capsule) being made to fit the finger with a rubber tube for recording the pressure on an ordinary blood pressure machine. The difference between the systolic pressure over the brachial artery and the digital artery was the same in a group of hypertension patients as in a group of normal controls. In cases of malignant hypertension the gradient was less. In a case of paroxysmal hypertension with increased epinephrin in the blood stream the gradient was extremely steep, obviously a result of the chemical agent. Cases with obstruction of arteries showed an increased gradient. Conclusion: medium and large-sized arteries do not play an important part in the production of peripheral resistance.

P. M. MACDONNELL

Recurring Myxomatous Cutaneous Cysts of the Fingers and Toes. Gross, R. E.: *Surg., Gyn. & Obst.*, 1937, 65: 289.

These thin walled structures, from 3 mm. to 1 cm. in diameter, filled with a colourless, gela-

tinous, viscid fluid, occur on the dorsal aspects of the fingers or toes, when in the proximity of the distal interphalangeal joint, on the dorso-lateral margin, or in the midline when not near the joint. They are rounded, elevated above the surrounding normal skin and may be faint yellow or faint blue in colour. Seventy-five per cent of the patients were women in late adult life. The etiology is unknown. The condition represents a localized degenerative (myxomatous) change in the deeper portion of the corium with later central liquefaction leaving a cavity without a lining membrane. Evidence of neoplastic growth is lacking. Many forms of treatment have been tried with recurrence, except in those patients who have had excision with x-ray therapy, 600 r.

FRANK DORRANCE

Obituaries

Hon. Dr. W. F. Roberts, Minister of Health and Labour in the New Brunswick Government, died on February 10, 1938. He was sixty-eight years of age, having been born on December 18, 1869. He was educated in the public schools of Saint John, and matriculated from the University of New Brunswick. He graduated in medicine from the Bellevue Hospital Medical College in 1894.

Dr. Roberts, from the first of his practice, enjoyed a very large clientèle and was extremely popular in his native city. He was deeply interested in politics all his life, and in 1917 was elected to the Provincial Government. In 1918 he established the Department of Health of New Brunswick, and was appointed Minister in charge of this department. He was the first Minister of Health in the British Empire, if not in the world. He remained in charge of this department until 1925, when his party was defeated. He returned to the Ministry of Health in June, 1935, in the government of Hon. Mr. Dysart. At this time the portfolio of Labour was added to that of the Ministry of Health. Dr. Roberts was directly responsible for the establishment of the Provincial Bacteriological, Pathological and Chemical Laboratory, which was opened by Dr. H. L. Abramson, an appointee of Dr. Roberts. In 1920 he established what has become a model department of vital statistics. It was largely due to his efforts that New Brunswick has been practically free from smallpox. Dr. Roberts established on a firm basis the medical examination of school children. At his instigation depots for the distribution of serum, vaccine and insulin, etc., have been established throughout the province. He was also influential in the establishment of venereal disease clinics, tuberculosis clinics, pre-natal and pre-school clinics. He placed the full power of his personality behind the movement to make pasteurization of milk compulsory in the province. He improved the regulations for the inspection of food. He was a member of many social orders, as well as being a member of the Kiwanis Club of Saint John. For fifteen years he was a commissioner for the City of Saint John. He was a Baptist and his church always held a very large place in his life. He was a teetotaler and an active agent in all temperance movements.

Dr. Roberts was the first physician to handle radium in a serious manner in New Brunswick, and will long be known for his work in physical therapy. He maintained a large clinic at his offices, and was head of the Department of Physical Therapy at the Saint John General Hospital. He was a Past-president of the Saint John Medical Society, and a Past-Commissioner of the Saint John General Hospital. He was Past-president of the American Academy of Physical Therapy, and Past-president of the Canadian Public Health Association. He is survived by his wife and one son. Dr. Roberts will be remembered in history for the outstanding work which he performed for his city, province, and for Canada as a whole, in public health matters. In spite of being a successful politician, he was of retiring disposition, his family, practice, and church taking the greater portion of his interest, aside from his political affiliations. He was a staunch friend and a generous opponent. His monument is an improvement in living conditions in the province and an appreciation of the benefits of public health measures, which were established by his efforts.

A. STANLEY KIRKLAND

Sir Thomas Stanton, K.C.M.G., Chief Medical Adviser to the Secretary of State for the Colonies since 1926, died in London on January 25, 1938.

Ambrose Thomas Stanton was born in Kendal, Ont., on November 14, 1875, son of Mr. and Mrs. Thomas Stanton, of Pontypool. He graduated at Trinity University, Toronto (M.D., C.M., 1899). He served as house surgeon at the Hospital for Sick Children, Toronto (1899-1900), Toronto General Hospital (1900-01). He continued his studies at University College, London and the London Hospital. He held numerous diplomas: M.R.C.S.(Lond.), 1905; D.T.M.&H.(Cantab.), 1906; D.P.H.(Lond.), 1922; F.R.C.P.(Lond.), 1926; Hon. D.Sc.(Tor.), 1933. He was a Fellow of the Royal Society of Tropical Medicine and Hygiene, and a corresponding member of the Société de Pathologie Exotique of Paris.

In 1908, Sir Thomas became bacteriologist at the Institute for Medical Research, Kuala Lumpur, Federated Malay States, of which he became Director in 1920. In 1926 he was Bissett-Hawkins medallist at the Royal College of Physicians, and Mary Kingsley Memorial medallist at the Liverpool School of Tropical Medicine in 1929.

Sir Thomas was a recognized authority on tropical diseases and the author of a number of works on the subject. He was knighted in the King's birthday honours in 1934.

Some five years ago Sir Thomas married Dr. Elizabeth O'Flynn, specialist in children's diseases in Queen Mary's Hospital, London, England. She survives him, and there are no children.

AN APPRECIATION

Sir Thomas Stanton is dead. I see it, printed in large type, in the newspaper before me. Like lightning my thought travels back through the years, noting the honours which came to him; the Knighthood granted by our late King George the Fifth; the foreign decorations so well deserved; the Doctorate of Science bestowed by his Alma Mater, our own University; until it halts on a day when we were only grown-up lads.

I have many memory-pictures of Ambrose Thomas Stanton, but none more vivid or more cherished than this one. It was a heavenly day in the autumn of '94. The country road from Kendall to Orono was a panorama of beauty. We had driven slowly, my uncle and I, over those hills of Clarke, and came through an avenue of brilliant maples to the cross-road at Kirby. A hundred yards to the north stood the frame village school-house. From it came the teacher, slowly ambling down the path on his bicycle. It was Stanton, and through all these years the picture of that charming young man has haunted my memory. His dreams were to come true. He came up to college that winter, and I took his place as teacher in that village school. Two years he had

taught; two years I taught; then followed him again into old Trinity.

All this long time our friendship has stood. For many years I have had only an occasional letter, but always I think of his happy boyish smile, which never faded, of his merry wit, which never dimmed, of his charming manner, which never altered.

Many worldly honours came to him and he deserved them all, for he accomplished much for others. But by us, who knew him long ago, Ambrose Stanton will be happily remembered, not for what he achieved but for what he really was. F. C. TREBILCOCK

Dr. James H. B. Allan died in Montreal on January 26, 1938, at the age of 75 years. He was born in Montreal, the son of the late James A. Allan, lumber merchant, and graduated in medicine from McGill University, and continued his studies and research work in Scotland and Austria. He practised only a short time in Montreal.

Dr. Charles Hewitt Amys, of Peterborough, Ont., died on January 19, 1938. Born in Lakefield, Ont., in 1872, he received his preliminary education at the Grove School, Lakefield, and the Peterborough Collegiate Institute. He graduated from Queen's University, where he won a scholarship in medicine and surgery with honours in 1899.

After spending a year doing post-graduate work in London, Eng., he began practising in Peterborough and resided there since. He was Medical Officer of Health for a number of years during the Great War and also served for a long time in a similar capacity for the village of Ashburnham before it was incorporated with Peterborough. He is survived by his widow; one daughter, Mrs. T. C. Thompson, of Montreal; and four sons, John Hewitt, Toronto; Roger H. and Spencer H., of Peterborough.

Dr. J. Albert Beauchamp, of St. Cesaire, Que., died on January 14, 1938, in his forty-third year. He was born in St. Telesphore and educated at Rigaud College and at the Université de Montréal (M.D., 1921).

Dr. Theodule Bruneau, of Montreal, died on February 9, 1938, in his sixty-fifth year. He was born in Montreal on July 11, 1873, completed his medical course at Laval University of Montreal, and later spent several years an as intern in Paris hospitals. Beginning his practice in 1900 he soon became director of Hotel Dieu clinics and a member of the faculty of medicine of the University of Montreal.

Dr. George Fisk, of Montreal, died on January 28, 1938, in his seventieth year.

Dr. Fisk was born at Abbotsford, Que., and received his M.D., C.M., from the University of Bishop's College in 1894. He also had an *ad eundem* M.D., C.M., from McGill. He was attached to the old Western Hospital and in later years with the Women's General, Montreal. He was the first to introduce the violet-ray lamp in Montreal. In addition to his practice he was medical referee for Canada of the Mutual Life Insurance Company of New York. He was buried at Abbotsford, the home of the family. The Anglican church there was founded by his grandparents.

Dr. Fisk's activities were not confined to the medical profession. He was one of the founders of the Boy Scout movement in Canada, organizing one of the first troops here in 1908. He served for 20 years as medical officer of the St. George Troop.

During wartime he was corps surgeon for Canada of the St. John Ambulance Corps. He went to Halifax in 1917 to attend the wounded in the explosion there. He was awarded the long service medal of the corps in 1930 and the medal with bar in 1935. He was made a member of the American College of Surgeons in 1918.

Dr. Fisk is survived by his widow, formerly Miss Mary Jane Savage, two sons, George Harold and Donald C. Fisk, of Montreal.

Dr. Maxwell Stephen Inglis, a retired physician, died in Vancouver on January 20, 1938, aged seventy-four. Dr. Inglis was born in Montreal and a graduate in medicine of the University of Manitoba (1891). He was also L.M.C.C. (1920). He served overseas in the Great War in the C.A.M.C., and at one time was a provincial coroner in Manitoba.

Dr. David C. Johnston, of St. John's, Newfoundland, died on January 8, 1938. He was born in 1903 and graduated from Pictou Academy in 1925 and later from Queen's University in 1931. He is survived by his widow, the former Miss Muriel MacKenzie, R.N., and their three year old son, Douglas.

Dr. Joshua N. Mack died at his home in Halifax on February 7, 1938, at the age of 93 years. Nova Scotia's oldest physician, Dr. Mack had been well and active until within a few days of his death. He was a native of Mill Village, Queens County, where he was born in 1844 and it was from his village school that he went directly to Harvard University. Here and at Bellevue Hospital Medical College he received his medical education, graduating in 1875. He first practised in Newfoundland. In 1887 he returned to his native province, moving to Bridgewater and later, Lunenburg. In 1901, after post-graduate study in London and New York, he took up his practice in Halifax, where he served for seventeen years. Retiring twenty years ago, he has since devoted himself to the care of his beautiful garden, and lived happily amongst his many friends whose highest esteem he held.

Dr. Mack was the son of Jason and Augusta (Miller) Mack of Mill Village. A brother, Hon. Jason N. Mack, President of the Legislative Council, and a sister, Mrs. John R. Creed, predeceased him by some years. Surviving are his widow, the former Miss Susan Wilson of Pictou, whom he married in 1888; and two sons, Dr. Frank G. and Frederick N. Mack, of Halifax.

Dr. Robert Patrick McLaughlin, of Ottawa, Ont., died on December 31, 1937. He was born in Cumberland, Ont., in 1867 and was a graduate of the University of Toronto (1903). Besides his widow, née Fannie McClive, Dr. McLaughlin is survived by one son, Dr. Harrison McLaughlin, of the staff of the Presbyterian Hospital, New York; two daughters, Jean and Margaret, at home.

Dr. Frank P. Patterson, of Vancouver, leader of the British Columbia Conservative Party and the official opposition in the British Columbia Legislature, died on February 10, 1938. He was born in Saint John County, N.B. in 1875, and was educated there, in British Columbia, and at McGill University (M.D., C.M., 1898) and European medical centres. He served with the Royal Canadian Army Medical Corps during the Great War. He was a Fellow of the Royal College of Surgeons, the Royal College of Surgeons(C.), and a member of other surgical and scientific bodies. He was chief surgeon of the bone and joint departments of the Vancouver General Hospital and of St. Paul's Hospital. He attended the Duke of Gloucester when the Duke broke his collarbone playing polo several years ago. He is survived by his widow; a son, Frank, studying at McGill University; and two daughters, Mrs. George White, and Dorothy, both in Vancouver.

Dr. Frank Sydney Rounthwaite, of Toronto, Ont., died on December 15, 1937. He was born in 1872 and a graduate of the Medical Faculty of Trinity University, Toronto (1895).

Dr. Charles Scott Russell, of Hamilton, Ont., died on November 5, 1937. He was born in 1888 and a graduate of Queen's University (1912).

Dr. Harold Spenceley, of Shedden, Ont., died on December 4, 1937, aged 42 years. He was born in 1895 and a graduate of Queen's University (1924).

Dr. Charles Lambert Brook Stammers, of Smith's Falls, Ont., died at the Civic Hospital, Ottawa, on January 27, 1938. He was a graduate of the Medical Faculty of Trinity University (1895).

Dr. David Stockley Sutherland, of River John, Pictou County, N.S., died suddenly in Halifax on January 26, 1938, in his thirty-eighth year. Dr. Sutherland was a graduate of Pictou Academy (1920), and Dalhousie University Medical School (1925). He had practised at Seabright and Chester. Two years ago he entered the British Colonial Medical Service in the British West Indies, returning recently to Halifax because of ill health. He is survived by his widow and two small children, by his father, mother and sisters.

Dr. Alfred Seeley Wade, of Renfrew, Ont., died on January 8, 1938. He was born in 1870 and a graduate of McGill University (1892).

News Items

Alberta

At the annual meeting of the Council of the College of Physicians and Surgeons of Alberta the former officers were re-elected: Dr. W. A. Wilson, Edmonton, *President;* Dr. W. V. Lamb, Camrose, *Vice-president.*

It was decided to submit a brief to the Rowell Royal Commission on Dominion-Provincial relations. Also discussed at this meeting was the formation of a Cancer Control Association under a plan adopted by the Canadian Medical Association under sponsorship of trustees of the King George the Fifth Cancer Fund. Members of the Council interviewed provincial health and relief branches regarding problems affecting the medical care of persons on relief and those living in the drought areas of Alberta.

The Council granted $250 for five scholarships for the medical students of the University of Alberta, as well as $200 towards the medical library of this Institution.

A new hospital has recently been completed at Canmore, which is considered to be the finest of its kind in the province. The erection of this edifice was made possible through the cooperation of the Canmore Coal Company and the community. The hospital is in charge of Dr. Gelfand, who has at his disposal all necessary modern surgical and x-ray equipment and up-to-date operating room facilities. G. E. LEARMONTH

British Columbia

A new wing of the Mission Memorial Hospital was formally opened recently.

Application has been made by the hospital committee of the Board of Trade of Oliver for incorporation of the Oliver Hospital Society. Following this, application is to be made to the Provincial Government for a grant for a hospital building. A generous offer of assistance has been made by the West Summerland Municipal Hospital, which has decided to donate x-ray equipment to the value of $1,000, which is being replaced by a new installation.

The superintendent of the Bella Coola Hospital, Dr. J. D. Galbraith, at the annual meeting reported that the indebtedness of the hospital has been reduced from $2,000 to about $700. This is chiefly due to large donations from the fishermen who fished one day for the hospital benefit, and assistance from the Provincial Government and the United Church of Canada.

The rate of deaths due to cancer in British Columbia is steadily increasing and has almost doubled in fourteen years, according to statistics compiled by H. B. French and J. D. B. Scott of the provincial vital statistics branch and made public here. In an analysis of the years 1921-35 inclusive, the report shows an increase from 393 to 893 in the number of cancer deaths and from 0.74 per 1,000 of population to 1.21 in the cancer death rate. In the same period the rate of cancer deaths to all deaths has increased from 8.59 to 13.02 per cent.

According to press reports, Health Insurance was again a subject of discussion in the Provincial Legislature in December. Although Conservative members, while supporting Health Insurance in principle, moved to delete appropriations for continuing the Health Insurance Commission, since no insurance scheme was in effect, C.C.F. members, under the leadership of Dr. Lyle Telford, insisted that the vote must be passed. Dr. Telford said that Health Insurance was bound to come and the medical profession would forfeit the support of public opinion if they do not back it in principle. Dr. F. P. Patterson, leader of the opposition, expressed the favour with which the Conservative party viewed Health Insurance and stated that they were not in favour of the present Act. Criticism of the members of the Commission was made by the Liberal member from Fort George for bringing in an Act that was inoperative, and he claimed that there had been lack of tact in dealing with the medical profession. It is understood that during 1938 the government will try to work out a new health insurance program which may be inaugurated in 1939.

D. E. H. CLEVELAND

Manitoba

The annual meeting of the Sanatorium Board of Manitoba was held in the Central Tuberculosis Clinic on February 1st. The Sanatorium Board has under its administration the following hospitals — Manitoba Sanatorium at Ninette; Central Tuberculosis Clinic, Winnipeg; St. Boniface Sanatorium, St. Vital; and King George Hospital, Winnipeg.

The total number of patients under treatment at the end of December was 655. A distinctly favourable trend noted at the Manitoba Sanatorium was the decrease of far advanced cases admitted. Ten years ago 75 to 80 per cent had reached an advanced stage as compared with 50 per cent in 1937; of the remainder 42 per cent were moderately advanced and 8 per cent minimal. It is felt that surgery and semi-surgical measures are of great value. On December 31st, of a total of 274 patients in Manitoba Sanatorium 85 per cent had pulmonary disease, and the collapsing of one or both lungs was done or tried in 90 per cent of the cases. Surgical treatment had increased over the previous year by 50 per cent. From the time that chest surgery began to be done at Ninette in April, 1935, thoracoplasties have been completed on 86 people; in 91 per cent there was definite improvement, and in 70 per cent there is likelihood of permanent cure.

The x-ray department made 8,152 x-ray films at the Sanatorium, and 6,000 were done by travelling

clinics. The average film and chemical cost at the Sanatorium was 44c. and on the travelling clinics 50c. The average food cost of meals at the Sanatorium was 11.5c. per meal, in spite of considerable advance of food prices.

The Sanatorium school has proved to be very useful; 124 patients were in attendance, 90 of whom were in bed all the time, the others being ambulant and able to attend morning school. Every effort was made to encourage study by all patients physically able for it.

In the travelling clinics 6,437 examinations were made, of which 3,636 were of white people and 2,801 Indians. Tuberculosis was discovered for the first time in 125, and it is significant that only 21 per cent of the new discoveries were found to be far advanced by this method of having the doctor go to the patient. Six Indian Reserves and seven Indian Residential Schools were surveyed.

The Central Tuberculosis Registry has been set up at the Central Tuberculosis Clinic in Winnipeg. On this registry are the names and complete records of every case of tuberculosis patient and contact in the province.

At the meeting of the Medical History Club in the Medical Arts Club Rooms, February 3rd, Dr. F. G. Allison spoke on "Withering, Burke and Hare—three public benefactors".

Professor A. T. Cameron addressed the Section of Obstetrics and Gynæcology of the Winnipeg Medical Society on February 9th on "The present status of female sex hormones". There was an animated discussion.

Commissioner George Carpenter, of the Salvation Army, officiated at the opening of a new public ward, X-ray Department and Premature Ward of Grace Hospital, Winnipeg, on February 9th.

Dr. Fulton Risdon, of Toronto, addressed the regular meeting of the Winnipeg Medical Society in the Medical College at 8.00 p.m., February 10th on "Recent and old injuries of face, nose and jaws". Members of the post-graduate course in traumatic surgery were present at the meeting.

Dr. J. H. Conklin was honoured by the citizens of St. James when, on the evening of January 26th, he was presented with a physician's watch in commemoration of his retirement from the School Board of St. James. Dr. Conklin has served on the School Board for twenty-five years, the greater part of that time as Chairman.

Drs. Curry McMillan, Bernard R. Mooney and H. McMillan Edmison are now associated and are limiting their practice to radiology.

Hon. I. B. Griffiths, Minister of Health and Public Welfare, entertained at a luncheon at the Manitoba Club on January 26th in honour of Dr. J. A. Ferrell and Dr. P. W. Covington, of the Rockefeller Foundation. Other guests were Hon. S. Garson, Provincial Treasurer, Dr. F. W. Jackson, Deputy Minister of Health; Dr. E. W. Montgomery, former Minister of Health; Dr. A. J. Douglas, City Health Officer; President Sidney B. Smith of the University of Manitoba; Dean A. T. Mathers, Drs. J. A. Gunn, C. R. Gilmour, J. D. McQueen, and C. W. Burns, President of the Manitoba Medical Association; Dr. O. J. Day, President of the Winnipeg Medical Society; Professor F. D. Cadham; Drs. E. S. Moorhead and Ross Mitchell. On the previous day Dr. Ferrell and Dr. Covington met the Health officers at a luncheon in the Hudson's Bay restaurant.

ROSS MITCHELL

New Brunswick

Lieut.-Colonel R. A. Hughes, D.M.O., M.D. 7, has arranged for an extensive series of lectures by headquarters' officers, to be delivered to the medical officers of the R.C.A.M.C. in his district. These lectures will be concerned solely with the administrative side of military units. The attendance was large so far, and a great deal of interest is being shown in the series.

At the time of writing, Hon. Dr. W. F. Roberts, Minister of Health in the Provincial Government of New Brunswick, is reported to be extremely ill. Dr. Roberts underwent an operation last year and appeared to be making satisfactory progress, but has recently suffered a severe relapse.

A. S. KIRKLAND

Nova Scotia

Public Health came in for its share of attention before the Royal Commission on Dominion-Provincial relations, in session at Halifax. The brief submitted by the provincial government states, in part, "The Department of Public Health in this Province should have further moneys for the development of public health units, for more extended services in the fields of maternal and child welfare and school hygiene, and for more generous provision in relation to other matters of social welfare which, in this Province, are administered by the Department of Public Health. For these purposes no less than $500,000 yearly is immediately required, over and above the present expenditures of this important department."

There have been only two cases of diphtheria reported in Wolfville since 1927 when the prophylactic use of diphtheria toxoid was introduced, according to Dr. C. E. A. DeWitt, Town Health Officer. The Town School Board plans on a survey of the schools with a view to introducing the tuberculin test as a routine procedure.

Dr. P. S. Campbell, Chief Health Officer, addressed the Nova Scotia branch of the Canadian Dental Hygiene Council on the importance of dental care in community welfare.

The Halifax Board of Health entered the fray between the National Fish Company and the Fish Handlers' Union, in the interests of sanitation. Strike breakers were being housed in the company's warehouses and offices during the night till the Health Board forced their withdrawal to a freighter that lay off the pier.

Idleness in the county jails was deplored by Dr. Curtis, physician to Colchester County jail, in his report to the county council. Some form of work, he felt, would improve their health and perhaps discourage some from appearing in jail so often.

Dr. J. W. T. Patton has been appointed by the Department of Pensions and National Health to examine applicants for pensions for the blind.

The need of a health unit in Cumberland County was stressed by Dr. J. W. Sutherland, in speaking before the Amherst Rotary Club.

With the appearance of a booklet recently by Dr. Hugh N. MacDonald, of Whycocomagh, older residents of this Cape Breton village recalled how, in years gone, the author had become wrestling champion of North America and, on another occasion, knocked out the great John L. Sullivan. There was no mention of this in Dr. MacDonald's book devoted to the story of the two Inverness families from which he sprang,

the MacDonalds and the MacKinnons, but the tale is vouched for that the 81 year old physician, noted always for his athletic prowess, defeated Lynch, then wrestling champion of America, while a student at Queen's in 1881. It was in Boston that he met John L. Sullivan. This famous character was in his hey-day at the time and, with typical belligerence, picked a quarrel with Dr. MacDonald which resulted in his being carried from the scene.

Dr. J. C. Ballem, Medical Officer of the Pictou County Asylum, requested the consent of the Board of Commissioners to employ the insulin shock method of treatment in certain selected cases.

A chlorination plant will be installed in the Amherst water supply following reports from the local health officer and the Department of Public Health that samples of the water show the presence of *B. coli*. Until recently the water has been very pure.

Dr. F. R. Davis, speaking before the Victorian Order of Nurses at Truro, dwelt on the importance of educating the public in matters of health and advocated that greater efforts be made in teaching the importance of the periodic health examination.

The opening of a new infirmary at the Provincial Sanatorium at Kentville has been made necessary because of the great size of the waiting list. At the present time there are 287 infirmary bed patients and 32 pavilion patients and it is thought that the new infirmary will make available sanatorium treatment to many more who urgently need it.

The need of a tuberculosis annex to the Colchester County Hospital for the care of the tuberculous of the county was urged by Dr. T. R. Johnson, County Health Officer in addressing the Colchester Municipal Council.

Over 10,000 children on Cape Breton Island have been immunized against diphtheria during the past year.

Dr. H. D. Chisholm was elected health officer of Pictou and Dr. Fraser Young, jail physician by the Municipal Council.

One of the problems that is making the medical profession more and more conscious of the need of further government control in medical matters came up for discussion before the Cape Breton Municipal Council. It is found that increasing numbers of patients refuse to accept responsibility for their hospital accounts and seem inclined to regard their bills as a County problem. ARTHUR L. MURPHY

Ontario

An announcement has appeared to the effect that the chiropractors and osteopaths of the Province of Ontario have applied in the legislature for a private Bill to amend Section 49 of the Medical Act, allowing them to use the title "Doctor". A letter has been sent out by the Ontario Medical Association to each of the affiliated Medical Societies, acquainting them with this proposal.

The Superintendent of the Fort William Sanitarium is conferring with the Department of Health in connection with a plan for the enlargement of the Sanitarium from 80 to 100 beds.

The daily newspapers announce that Toronto's Birth Control Clinic will close on March 31st, due to the withdrawal of the support of the Kitchener manufacturer who founded the clinic four years ago and who has financed it at a cost said to be approximately $25,000 a year. Miss G. A. Brand, R.N., who has been in charge of the clinic since its opening, states that 25,500 birth control cases have passed through this clinic, and that in 75 per cent of these cases no payment was made. She is personally of the opinion that, for the indigent, the welfare voucher should be made acceptable for contraceptives as it is in Winnipeg. Three women physicians of the Women's College Hospital are on the staff.

Mrs. W. E. Danner, of Perth, has donated some $30,000 to the Great War Memorial Hospital in Perth, for the erection of a new wing to accommodate 27 additional beds.

Wreckers have just completed demolishing the old building of the Women's College Hospital at 125 Rusholme Road, which was vacated when the hospital moved to its new quarters at Surrey Place.

The Ottawa Civic Hospital approved the adoption of an eight-hour day for pupil nurses. The Executive Report did not directly recommend the change but asked that provision be made for the cost in the 1938 estimates.

The City Council of London is making application to the Ontario Legislature for the passage of a Bill which will delete that clause of the Hospitals Act which sets forth that a practising medical doctor cannot be a member of a hospital board such as the Trust administering Victoria Hospital.

Dr. Fred Logan, Lindsay, recently appointed Superintendent of the Toronto General Hospital, was honoured in his home town by a testimonial banquet when citizens from all walks of life paid tribute to the work he had done during the twelve years of his practice there.

On January 19th, the Hamilton Health Association announced the receipt of a gift of $250,000 from Mr. Charles S. Wilcox. It is proposed to build a new pavilion which will replace the last of the shacks remaining on the Mountain. It will be a sanatorium of the most advanced type. J. H. ELLIOTT

Saskatchewan

A combined meeting of the Departments of Pathology and Pædiatrics of the Regina General Hospital was held recently when the following papers were given: "Pathology of rickets", Dr. J. C. Paterson; "Report of a case of rickets", and "Report of a case of tetany", Dr. U. Gareau; "Report of a case of peritonitis of pneumococcal origin and following appendicitis in children", Drs. F. W. Schroeder and M. A. Currie; report of "A case of vitamin B deficiency", and "Report of a case of acrodynia", Dr. L. Brown.

Dr. A. C. MacMillan was elected president of the medical staff of the Grey Nuns' hospital for 1938. Other officials elected were: *Vice-president*, Dr. M. A. Currie; *Sec.-treasurer*, Dr. D. C. McRae; *Executive Members*, Drs. H. M. Graham, L. Roy and H. Spooner.

Dr. L. M. Hanna has been appointed Assistant Medical Health Officer for the city of Regina. Dr. Hanna graduated from Queen's in 1919 and has practised in Brownlee, Sask., for the past eighteen years. Medical relief care will be confined to Dr. Hanna and his staff and general public health work to Dr. George R. Walton. LILLIAN A. CHASE

General

The Great Lakes Sectional Meeting of the American College of Surgeons, including Ontario, Quebec, and the states of New York, Ohio, Michigan, and Pennsylvania, will be held in Toronto, Ont., March 22nd to 24th. The headquarters will be at the Royal York Hotel. A most active Committee on Local Arrangements, headed by Dr. W. E. Gallie, is making excellent plans for this meeting. The program will consist of clinics, scientific sessions, hospital conferences, medical motion pictures, and other features. A visiting group of ten or twelve outstanding surgeons will participate.

Tuesday, March 22nd.—Registration and general information for Fellows of the College, hospital representatives, and guests; operative and non-operative clinics, surgery and the surgical specialties, local hospitals; hospital conference; medical motion pictures: (1) general surgery, (2) eye, ear, nose and throat surgery; annual meeting, Fellows of the College; medical motion pictures, general surgery; scientific meeting, general surgery; medical motion pictures, eye, ear, nose and throat surgery; hospital conferences.

Wednesday, March 23rd.—Registration and general information for Fellows of the College, hospital representatives, and guests; operative and non-operative clinics, surgery and the surgical specialties, local hospitals; hospital conference; medical motion pictures, general surgery; scientific meeting, general surgery; scientific meeting, eye surgery; scientific meeting, ear, nose and throat surgery; hospital conference; medical motion pictures, general surgery; scientific meeting, general surgery; scientific meeting, eye surgery; scientific meeting, ear, nose and throat surgery; motion pictures for hospital representatives.

Thursday, March 24th.—Registration and general information for Fellows of the College, hospital representatives, and guests; fracture clinic; operative clinics, eye, ear, nose and throat surgery; hospital conference; scientific meeting (panel round table conference), eye surgery; scientific meeting (panel round table conference), ear, nose and throat surgery; cancer clinic; hospital conference; medical motion pictures, general surgery; community health meeting.

This meeting will be of interest not only to Fellows of the College but to the medical profession at large, as well as to hospital trustees, superintendents, nurses, and hospital personnel. There is no registration fee.

The American Association of Obstetricians, Gynæcologists and Abdominal Surgeons—Foundation Prize.—(1) The award which shall be known as "The Foundation Prize" shall consist of $500.00. (2) Eligible contestants shall include only (*a*) interns, residents, or graduate students in obstetrics, gynæcology or abdominal surgery, and (*b*) physicians (with an M.D. degree) who are actively practising or teaching obstetrics, gynæcology or abdominal surgery. (3) Manuscripts must be presented under a nom-de-plume, which shall in no way indicate the author's identity, to the Secretary of the Association together with a sealed envelope bearing the nom-de-plume and containing a card showing the name and address of the contestant. (4) Manuscripts must be limited to 5,000 words and must be typewritten in double-spacing on one side of the sheet. Ample margins should be provided. Illustrations should be limited to such as are required for a clear exposition of the thesis. (5) The successful thesis shall become the property of the Association, but this provision shall in no way interfere with publication of the communication in the journal of the author's choice. Unsuccessful contributions will be returned promptly to their authors. (6) All manuscripts entered in a given year must be in the hands of the Secretary before June 1st. (7) The award will be made at the annual meetings of the Association, at which time the successful contestant must appear in person to present his contribution as a part of the regular scientific program, in conformity with the rules of the Association. The successful contestant must meet all expenses incident to this presentation. (8) The President of the Association shall annually appoint a Committee on Award, which, under its own regulations shall determine the successful contestant and shall inform the Secretary of his name and address at least two weeks before the annual meeting. Jas. R. Bloss, M.D., Secretary, 418 Eleventh Street, Huntington, W. Va.

Archives Internationales des Brucelloses.—The social danger arising every day from human and animal brucellosis has made urgent the creation of a review which will centralize the various studies on this subject, which have been pursued hitherto without a well defined plan. It was voted at the International Congress of Avignon to establish the *Archives Internationales des Brucelloses* whereby it is hoped that the results of the research work published therein will interest the world at large. The first number is expected to be out on January 1, 1938.

All interested should communicate with Dr. Jos. Jullien, Managing Editor of the *Archives Internationales des Brucelloses*, Joyeuse (Ardèche), France.

Osler Scholarship.—This scholarship, which has a value of $975.00, is awarded by the Canadian Medical Association every third year to a candidate nominated by the Faculty of Medicine, McGill University, in order that such candidate may pursue special studies to advance the knowledge of medicine and to improve the teaching of clinical medicine. Applications, addressed to the Dean of the Faculty of Medicine, will be received up to, and including, March 31, 1938.

The conditions attached to the scholarship shall be: (1) The candidate must be a graduate of not more than ten years' standing and, other things being equal, preference shall be given to a graduate of McGill University; (2) he must have shown definite promise of achievement; (3) he must submit a specific program of study, which must be approved by the Committee appointed by the Faculty. Further information may be obtained from the Dean or Associate Dean, Faculty of Medicine, McGill University.

Book Reviews

Treatment of Diabetes Mellitus. E. P. Joslin. 6th ed., 707 pp., $7.00. Lea & Febiger, Phila., 1937.

This book needs no introduction. A new edition, however, is not a reprint, and the contents show that the fifth edition has been thoroughly revised with the addition of much valuable material which has appreciably increased its size.

There is one chapter only which, in the opinion of the reviewer, mars the general standard set by this authoritative work on diabetes. This deals with his experiences and those of others with different mixtures of protamine, zinc and insulin. Protamine zinc insulin is now a standard product; for a given number of units of insulin it contains a definite quantity of zinc and a definite quantity of protamine. The results obtained with this product, therefore, are in some instances not even approximately comparable with those of earlier mixtures. This chapter is, therefore, more likely to confuse than enlighten, since the earlier and more recent experiences are not clearly defined; protamine insulin and protamine zinc insulin are, for example, discussed as though the products are identical. In fact, the author states that, in general, throughout the book, when the words protamine insulin are used they refer to protamine zinc



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insulin. The following is taken verbatim as an example: "Today the general practitioner can start his patient upon diet and (PI) at the first visit, confident that reactions will not result during the following twenty-four hours. By return visits, daily, then every other day, later two times a week, and soon once a week, once in two weeks, and eventually once a month or even less often, he can easily, safely and efficiently treat his case, and at the same time avoid prolonged single seances for instruction which rob him of his time and overwhelm the patient with what he does not know. PZI par excellence is the family-doctor's type of insulin." It is obvious, therefore, that, except for the statement of the fact that in the treatment of diabetes there is now available a more effective form of insulin, this chapter serves no purpose. Aside from this one chapter, however, as with previous editions, no medical library in the English language can be said to be complete without this authoritative work.

Heart Failure. A. M. Fishberg, M.D. 771 pp., illust., $8.50. Lea & Febiger, Phila., 1937.

This is not just another book. It is, as its title implies, a book on failure of the heart and of the circulation, with the two as one entity. The theme of the book is cardiac and vascular dynamics. It is not a new approach. Harrison in his "Failure of the Circulation" discusses the various problems from a similar point of view and his classification of hyperkinetic, hypokinetic, and dyskinetic syndromes is accepted and further developed in the author's division of failure into hyposystolic and hypodiastolic types of cardiac failure and failure of the peripheral circulation. This division into types is carried throughout the book and applied specifically to the effects of the various types of structural change and to the explanation of clinical signs and phenomena. The importance and practicability of venous pressure, observations and estimations, are a feature throughout.

The first few chapters are given to the physiology and the pathological physiology of the circulation. This is possibly the most valuable part of the book. It has the clinical viewpoint and a number of practical methods of measuring various functions of the circulation are clearly described. The next few chapters deal with the various types of dyspnœa and then cyanosis, œdema, and pulmonary engorgement. The chapter on gallop rhythm is good. The portion dealing with peripheral failure—shock—vies with the first portion of the book in interest and importance. Treatment occupies the final section and while the principles there are pretty well orthodox they too are derived from previous discussion and follow logically.

The book is written in textbook fashion and the style is clear. The limits of present day knowledge in this field are well defined. The author exhibits a wide familiarity with the literature, and the bibliography is quite full. It is stated in the preface that the work is for the general practitioner, but most decidedly it has an important place on the shelves of the internist as well.

Diseases of the Ear, Throat and Nose. J. D. McLaggan, M.A., M.B., F.R.C.S.(Eng. and Edin.). 338 pp., illust., 15 s. H. K. Lewis, London, 1937.

This work is one of the General Practice Series. The preface states that it is an attempt to teach the principles of ear, throat and nose work. Within the limitations of a volume of this size it has fulfilled its purpose admirably, and the busy general practitioner will find it very useful for quick reference. The descriptions of surgical operations cannot of necessity be given in detail but will give the practitioner an intelligent understanding of the problems involved. One would like to see more attention given to the management of hæmorrhage, the bugbear of this field of medicine.

The Principles and Practice of Rectal Surgery. W. B. Gabriel, M.S., F.R.C.S. 2nd ed., 353 pp., illust., 28s. H. K. Lewis, London, 1937.

This second edition of "The Principles and Practice of Rectal Surgery" by Mr. Gabriel is presented five years after the publication of his first edition, and is a detailed record of the experience and progress in the diagnosis of rectal ailments and the practice of this branch of surgery, which the author has collected since 1920. The whole field of rectal surgery is covered in a most thorough manner. The volume is noted particularly for the newer work on surgical anatomy contributed in collaboration with Mr. O. V. Lloyd-Davies. Mr. Gabriel has made the timely observation that a certain percentage of fistulæ-in-ano eventually become malignant. In the new material one notes: the rôle of epidermophytosis in pruritus ani; injuries of the rectum; lymphogranuloma inguinale, and many new refinements of technique and post-operative care. The chapters on benign and malignant tumours of the terminal bowel are thoroughly and extremely well written. Mr. Gabriel's perineo-abdominal operation for cancer of the rectum presents itself as one of the most important features of the book.

Pediatric Urology. M. F. Campbell, M.S., M.D., F.A.C.S. Vol. 1, 576 pp.; vol. 2, 540 pp., illust., $15.00 per set. Macmillan Co., New York, 1937.

To the urologist, no group of specialists appears to be more urologically minded than the pædiatrists. It is, therefore, fitting that these two attractive volumes should be devoted to the consideration of urological problems in the young. In them, disturbances of the urinary tract occur only too frequently, and it is unfortunate that many having the responsibility of the care of the young are unaware of this fact, and are equally ignorant of the fact that the urologist is provided with an armamentarium capable of carrying out urological studies in the most youthful subjects, with a facility as complete and adequate as in those of a maturer age. This work undoubtedly should be of great value in focussing the attention of the medical profession at large upon this point. The work is of equal importance to pædiatrist and urologist because of the important statistical studies of urological conditions in infants and children, which, in view of the author's unusual opportunities, are almost unique.

In the very young anomalies of the genito-urinary tract play a most important rôle in the production of urinary lesions, and Dr. Campbell has devoted 212 pages to the consideration of this aspect of urology in children. As indicated above, he has had an unusual access to a wealth of clinical and pathological material. Of this material he has made good use, as may be seen in the resultant statistical studies.

The volumes are printed on good paper and are well and copiously illustrated. The bibliography at the end of each chapter is worthy of a special commendation by the reviewer. To anyone who has to do with the care and treatment of the young, the volumes can be warmly recommended.

Pathology of the Central Nervous System. C. B. Courville, M.D. 344 pp., illust., $5.75. Pacific Press Publishing Assn., Mountain View, Calif., 1937.

This broad survey of neuropathology as it applies to the problems of the surgeon, physician, otologist, obstetrician, and pædiatrician makes readily available a wealth of neuropathological data. The incidence of the various lesions has been compiled on the basis of 15,000 autopsies from a general hospital. The range of subject matter is wide and emphasis is laid constantly upon the pathogenesis of disease of the central nervous system. The treatment of brain abscess is



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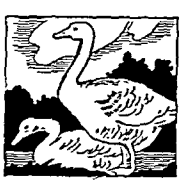
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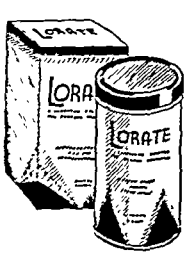


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particularly happy in this regard. There is but little space devoted to the relationship of pathological processes to signs and symptoms. A chapter devoted to the cerebrospinal fluid has not been included, and its varying responses during life to pathological processes of the central nervous system have not been stressed. Deficiency diseases are disposed of rather briefly.

This work appeals to the reviewer as a suitable book of reference for student and practitioner, providing as it does a foundation for consideration of clinical problems together with many indispensable key references.

Protoformotherapy in Treatment and Prevention. N. E. Ischlondsky. 227 pp., illust., 21s. Henry Kimpton, London, 1937.

The author has given the name "Protoformative Incret" to an extract prepared in accord with the most recent technique from embryo corresponding to the period of greatest biological activity, which he claims takes place at the end of the third or beginning of the fourth month in the human being. Experimental work was carried on with guinea-pigs, but since 1929 intramuscular injections of the incret have been given to about 1,200 human patients. This has been prepared in two extracts, one containing that of all body tissues with the exception of the recognized endocrine glands, and the other that of the entire body. He hypothecates a cellular life in which all cells of a species have hormonal activity with later development of specific hormones for specialized organs. There is a claim of priority in concept and in experiment in reference to the most recent thesis on internal secretory hormones, antihormones prohormones and activators. He accepts the physiological activities of the pituitary gland as a most prominent governing rôle.

The results from his clinical work, and that of his collaborators, are truly surprising. They have been carefully classified. If the clinical results can be duplicated and substantiated and the increts prepared in sufficient amounts our present concepts of prevention and treatment of disease will undergo a change for the better. His work is indeed broad in its biological conception of life processes. Every physician who uses endocrine extracts should read this book; it is stimulating; it is critical; and it is constructive.

Biological and Clinical Chemistry. M. Steel, Ph.D. 770 pp., illust., $8.00. Lea & Febiger, Phila., 1937.

"In the present text the author has attempted to blend theoretical and practical biochemistry and biophysics with chemical pathology and clinico-chemical methods". To this excerpt from the preface it may be added that this book covers the fields of both biochemistry and pathological chemistry, as known in several of our own universities, and includes instructions for laboratory work interspersed with the theoretical treatment of these subjects. The subject-matter of the book is extensive and supplemented with adequate references; the subject-form of the book is open to criticism. For example, vitamins and hormones are treated in both their academic and pathological aspects in Chapters XI and XII, and nutrition and normal protein metabolism not till Chapters XVIII and XXI respectively.

The dialectical relationship of theory and practice, of lectures and laboratory, is recognized by all teachers in the sciences, but is met in different ways. Through a keen desire, no doubt, to keep the experimental evidence before the too speculative mind, Professor Steel has attempted to include his practice with his theory. More strictly he has given us a mixture of theory and theory of practice: for reading about an experiment can never be the same thing as doing it, or, conversely, the reading of textbooks is not a usual part of laboratory work. Detailed directions for experiments are distracting to the mind on a definite train of thought. The incorporation of experimental evidence in the theoretical treatment of a subject is quite a different matter from the addition of details—often requiring quite different theory—as to how that experimental evidence is attained. Thus, in the reviewer's opinion, this book would have been better without its experiments, although these appear to be well enough chosen and adequately described. The book contains much up-to-date and accurate information, and will be found useful by both students and medical practitioners.

Clinical Chemistry in Practical Medicine. C. P. Stewart, M.Sc. and O. M. Dunlop, B.A., M.D., F.R.C.P.E. 2nd ed., 372 pp., $3.00. Macmillan, Toronto, 1937.

The authors' aim was to treat adequately but concisely the everyday problems requiring chemical investigation. The value as well as the limitations of these investigations are clearly pointed out and the authors wisely emphasize the fact that the results of biochemical investigations must always be considered in conjunction with those of clinical examination, and that taken alone can rarely, if ever, justify a diagnosis.

This second addition is somewhat revised. Some tests have been wisely omitted, others advantageously added. It should prove of value to the practitioner and student.

The Cerebrospinal Fluid. H. H. Merritt and F. Fremont-Smith. 333 pp., illust., $6.00. McAinsh & Co., Toronto, 1937.

Only in the last decade has it been possible to evaluate with any degree of certainty the diagnostic significance of completely examined cerebrospinal fluid. Such progress has resulted from careful correlation of cerebrospinal fluid studies with detailed clinical case records and verified diagnoses. Merritt and Fremont-Smith, through their long association with the Cerebrospinal Fluid Laboratory of the Boston City Hospital, have contributed much toward this advance. In this book they have made a thorough analysis of over 21,000 fluids, to show how this examination can be used in the differential diagnosis of disease. The chemistry and pathological physiology of cerebrospinal fluids are considered in moderate detail, and the routine methods of testing briefly clearly set forth. The technique of lumbar and of cistern puncture are carefully considered. The greater and most valuable part of the book deals with the cerebrospinal fluid syndromes in every condition in which such an examination might conceivably be used. In each syndrome the possible variation in the pressure, appearance, cell count, and chemical nature of the fluid is concisely presented, followed as a rule by a discussion of the differential diagnosis. In many conditions the authors present the changing pattern as the case progresses, and show the effect of treatment upon the spinal fluid. A chapter is included on the methods of roentgenography of the ventriculo-subarachnoid space, more particularly on encephalography. This is informative but too restricted in scope, as well as insufficiently illustrated, to be of practical value, and might well have been left out. Not only as a comprehensive reference book but as a very practical handy guide this text should be of great value to pathologists, technicians, and neurologists, as well as to anyone whose clinical work entails a frequent consideration of the cerebrospinal fluid.

Short Years, the Life and Letters of John Bruce MacCallum, M.D., 1876-1906. A. Malloch. 343 pp., $3.50. Normandie House, Chicago, 1938.

D-mn the tubercle bacillus! Osler wrote of the subject of this fine memoir that he was "one of the most brilliant young men it has ever been my lot to

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teach. . . Alas! he succumbed suddenly, to the irreparable loss of science in America. He had a mind of singular acuteness, a clear judgment, and he had caught from Mall some measure of that investigating spirit that has made the anatomical school of John Hopkins University so famous. When the news reached *me of his death, one morning as I sat at breakfast,* I broke down in an irresistible paroxysm of regret and had to leave the table''—one of the few occasions when Osler's *æquanimitas* failed him.

Son of the versatile Dr. G. A. MacCallum, of Dunnville and London, Ont., J. B., like his elder brother, W. G., the pathologist, was one of the large group of distinguished research workers, pupils of Ramsay Wright, which the University of Toronto contributed to Johns Hopkins in the '90's. During his short years at Baltimore and in California, under Loeb, where he bravely fought a losing fight against tuberculosis, he did pioneer work of permanent value on the embryology and histology of the heart muscle and the intestines, and on the action of calcium and the salines. His letters give an introspective picture of his student days, his work, his summers in Muskoka, his travels—to Germany, Jamaica, Denver (where he practised briefly) and California, and in addition they have a literary, romantic, and psychological interest. He was also an artist, musician, story-writer, and poet; and the few poems included make one wish that room had been found for more. The ''Spirit of Death'', when he conjured it, answered only too promptly:

Oh come, be swift and take me while I stand,
My work still strong beneath a steady hand,
A life that ne'er grew old!

As might be expected of the distinguished Canadian librarian of the New York Academy of Medicine, Dr. Malloch has skilfully handled his abundant material. It is that best kind of work, a labour of love, for MacCallum was a hero to him in his boyhood. The book is finely printed.

Monograph on Veins. K. J. Franklin, D.M., M.R.C.P. 410 pp., illust., $6.00. C. C. Thomas, Springfield, Ill., 1937.

The author introduces the following quotation from a letter by J. S. Haldane, ''Physiology may be compared to a house partly built, partly building, and partly being re-built''. In no respect is this more applicable than as regards our knowledge of the circulatory system, and, probably, one detail which has suffered neglect more than any other is the venous circulation. The present work reviews and enlarges our knowledge of the veins with unusual and welcome comprehensiveness. Nowhere else is so much brought together on this branch of physiology.

It is however much more than a mere collection of facts. Physiology is fully discussed. The chapter on the function of venous valves, for example, is most enlightening, not the least interesting part being the uncertainty that still exists regarding some aspects of their function. Chapters on embryology and comparative anatomy complete a full and valuable contribution to the physiology of the veins.

Twenty-five Years of Health Progress. L. I. Dublin, Ph.D. and A. J. Lotka, D.Sc. 611 pp. Metropolitan Life Insurance Co., New York, 1937.

This comprehensive study is a veritable mine of information regarding what has happened during the course of a quarter of a century among the policyholders of the Industrial Department of the Metropolitan Life Insurance Company. As this group has proved to be representative of the country as a whole, the happenings, as recorded, may be interpreted in a national way.

The painstaking work of Doctors Dublin and Lotka is deserving of the highest praise, and the clearness of their exposition of the statistical material makes the volume readily understandable by the person with not too statistical a mind. Through this publication the Metropolitan Life Insurance Company has added to the many worth-while contributions it has made in the field of Public Health.

Russian Medicine. W. H. Gantt, M.D. Clio Medica Series No. 20, 214 pp., illust., $2.50. P. B. Hoeber, New York, 1937.

This is volume 20 of the Clio Medica series of primers of the History of Medicine. Dr. Gantt is well qualified for the task of compiling a history of Russian medicine, having served on the American Relief Administration in 1922-23 and later having worked for five years under the late Professor Pavlov. In 1935 he again visited Russia, and was thus able to observe the Soviet phase at different stages of development. He finds that medicine was much later in developing in Russia than in Central and Western European countries. While medical schools and hospitals staffed by foreign doctors were established during the reign of Peter the Great, it was not until the 19th century that independent Russian medicine came into being, associated with such names as Pirogov, Pavlov, Mechnikov and Botkin. The chapter on famines and epidemics makes gruesome reading. Dr. Gantt's observations during his different visits to Soviet Russia have led him to believe that ''a completely regenerated Russia is arising from the ruins of the old''. While his review of Soviet medicine is necessarily brief, it would appear to be a well-balanced one and will be read with interest. Of Soviet achievements he mentions the marked reduction of the death rate and infant mortality rate, the control of such epidemic diseases as small-pox, typhoid and cholera, the great increase in the number of hospitals, sanatoria and rest homes, and the vast campaign in health education. He noted on his last visit that the attitude of the medical profession in Russia is now almost entirely favourable to the new system of socialized medicine.

Physical Signs in Clinical Surgery. H. Bailey, F.R.C.S.(Eng.). 6th ed., 284 pp., illust., $6.25. Macmillan Co., Toronto, 1937.

This book is always up to date. One will look for a long time amongst books on physical signs before finding one with such carefully chosen and beautifully reproduced illustrations. They really do teach.

Minor Maladies and their Treatment. L. Williams, M.D. 7th ed., 439 pp., $3.00. Macmillan Co., Toronto, 1937.

There are many useful hints on treatment in this book.

The Development of the Vertebrate Skull. G. R. de Beer, M.A., D.Sc., F.L.S. 552 pp., illust., $9.50. McAinsh, Toronto, 1937.

Anyone who has ever attempted even in a general way to compare the skull of man with that of lower mammals or reptiles and to determine the morphology of the different parts will realize the thorny and difficult field into which this book ventures. And it enters this field in no casual way but to a depth of 515 closely printed pages with abundant simple and clear illustrations.

The book is divided into three parts. The first deals with some general questions of the nature of cartilage and bone and goes on to review Goethe's theory that the skull is made up of several fused vertebræ. This theory of course has not stood the test of time but out of it arose the recognition of the segmental structure of the posterior end of the skull.

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The second part, constituting the main bulk of the book, consists of a detailed and comprehensive account of our present knowledge on both the chondrocranium and the adult skull in every group of vertebrates. Not many living men are competent to pass judgment on the great mass of facts which are collected here, and the reviewer cannot claim to possess the knowledge necessary for this task. In fact, time alone will reveal the merits or the failings of the work. That it represents a great amount of painstaking labour and that it will materially assist future workers in this field are obvious.

The third, and for general reading the most interesting, part of the book deals with various problems arising out of a comparison of the chondrocrania in different forms and the homologies of various parts in both the chondrocrania and bony skulls. The author discusses the relative merits of cartilage and bone as materials for a scaffold supporting and protecting the brain, and shows that in the early embryonic stages when the brain is growing rapidly cartilage possesses a great advantage in its power of rapid interstitial growth which enables it to function efficiently and grow rapidly at the same time. The embryonic chondrocranium of higher forms is itself a functioning structure and has evolved along its own lines; it cannot be regarded as merely an ancestral type of adult skull which has been pressed back into the embryonic stage of development in later forms. And this independent evolution of the chondrocranium makes it very unsafe as a basis for phyllogenetic arguments along the lines of the recapitulation theory. The book ends with a list of queries and problems awaiting solution.

In producing a work of this magnitude and scope it is almost impossible to avoid some errors and misprints, but it was a rather unfortunate slip that the table on page 364 states that the human basioccipital and basisphenoid unite in the 18th *month* after birth.

Diseases of the Skin. Late R. W. MacKenna, M.A., M.D., B.Ch. 4th ed. revised by R. M. B. MacKenna, M.A., M.D., M.R.C.P. 557 pp., illust., $6.00. Macmillan, Toronto, 1937.

Although in this edition the book has been enlarged by more than 50 pages and contains 46 coloured plates in addition to many excellent black and white illustrations, the price has been reduced to six dollars. As in the former edition all the common diseases of the skin are adequately dealt with and a number of useful prescriptions given. A chapter on the atrophies has not been included, and although most of them can be found in other parts of the book, it would be more convenient if they were grouped together.

Primary Carcinoma of the Lung. E. J. Simons, M.D. 263 pp., illust., $5.00. Year Book Publishers, Chicago, 1937,

Primary carcinoma of the lung is a disease which has increased both absolutely and relatively in recent years, until its incidence, estimated at 2 per cent in the first decade of this century, has now reached 10 per cent of all cancers. According to some studies it would seem that 12 to 15 per cent of all cancers are now cancer of the lung.

The author is a physician in general practice in a small town whose interest in the subject was aroused through a case arising in his own practice. He has made a survey of the literature of pulmonary cancer, has presented a summary of the important contributions, and gives a balanced summary of his conclusions in the fields of incidence and etiology. Written by a general practitioner for the man in general practice he discusses at length the clinical features of the disease, the symptomatology, physical findings, diagnostic methods and differential diagnosis, while treatment is as fully discussed, the surgical section having been reviewed before publication by Evarts Graham.

The physician will find that it summarizes all he should know about the subject; the pathologist will find it an excellent help in his gross and microscopic study of sputum, pleural fluid and tissue; the radiologist and bronchoscopist, a guide to diagnosis as well as treatment; while the surgeon will probably find much that will be of help in the discussion of methods of diagnosis and in the application of surgery in those cases amenable to operation. Most important is the emphasis placed upon the early symptoms of the disease. It is a timely monograph, embracing every phase of a subject of steadily increasing importance.

BOOKS RECEIVED

International Clinics. Edited by L. Hamman, M.D. Vol. 4, forty-seventh series, 343 pp., illust., $3.00. J. B. Lippincott, Montreal, 1937.

The Doctor's Bill. H. Cabot. 313 pp., $3.00. Columbia University Press, New York, 1935.

Cancer the Great Darkness. By the Editors of *Fortune*. 80 pp., $1.00. Doubleday, Doran & Co., Toronto, 1937.

The Patient and the Weather. W. F. Petersen, M.D. Vol. 4, part 3. Organic Disease—Surgical Problems. 651 pp., $10.00. Edwards Bros., Ann Arbor, Mich., 1938.

Materia Medica for Nurses. A. M. Crawford, M.D., F.R.F.P.S.G. 4th ed., 106 pp., 3s. 6d. H. K. Lewis, London, 1937.

Obstetric and Gynæcologic Nursing. H. Falls, M.S., F.A.C.S. and J. R. McLaughlin, B.A., R.N. 492 pp., illust., $3.50. McAinsh, Toronto, 1937.

Diabetic Manual. E. P. Joslin, M.D. 6th ed., 219 pp., illust., $2.00. Lea & Febiger, Phila., 1937.

Yoga, a Scientific Evaluation. K. T. Behannan, Ph.D. 270 pp., $2.75. Macmillan Co., Toronto, 1937.

The Baby's First Two Years. R. M. Smith, A.B., M.D., Sc.D. 4th ed., 121 pp., $1.75. Houghton Mifflin Co., Boston, 1937.

First Aid to the Injured and Sick. Edited by F. C. Nichols, M.C., M.B., Ch.B., M.R.C.S., L.R.C.P., L.D.S. 16th ed., 318 pp., $0.75. Macmillan, Toronto, 1937.

Man, Bread and Destiny. C. C. Furnas, Associate Professor of Chemical Engineering, Yale University, and S. M. Furnas. 364 pp., $3.00. Williams & Wilkins, Baltimore, 1937.

Massage and Remedial Exercises. N. M. Tidy. 3rd ed., 455 pp., illust., $4.50. Macmillan, Toronto, 1937.

Surgeon's Pocket Book. H. S. Souttar, D.M., M.Ch., F.R.C.S. 2nd ed., 285 pp., $2.25. Macmillan Co., Toronto, 1937.

Third Report of the Wellcome Research Laboratories at Gordon Memorial College, Khartoum. A. Balfour, M.D., B.Sc., F.R.C.P., D.P.H. 477 pp., illust. Baillière, Tindall & Cox, London, 1908.

Handbook of Accepted Remedies. Edited by P. J. Hanzlik, M.D. 2nd ed., 115 pp., $1.00. J. W. Stacey, San Francisco, 1937.

Mentality and Homosexuality. S. Kahn, B.S., M.A., Ph.D., M.D. 249 pp., $3.00. Meador Publishing Co., Boston, 1937.



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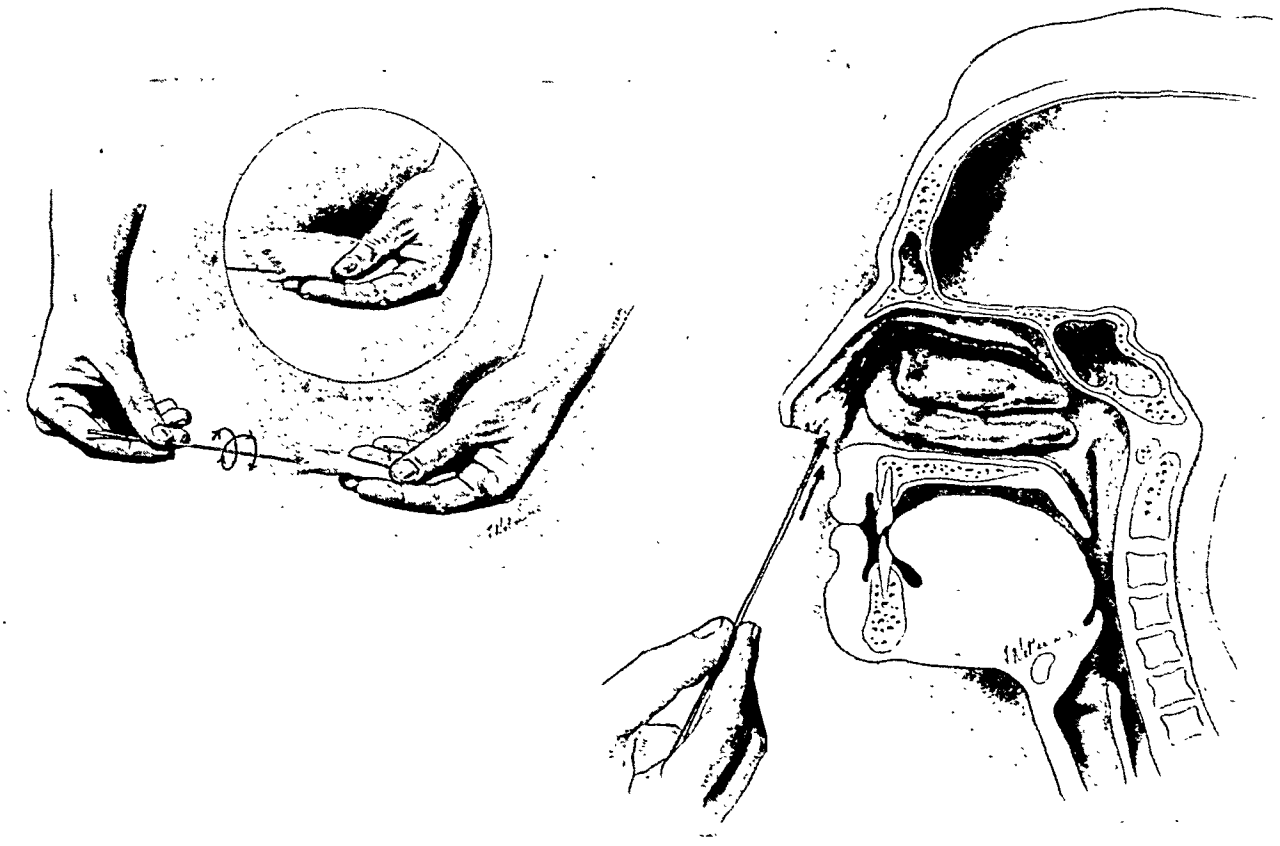
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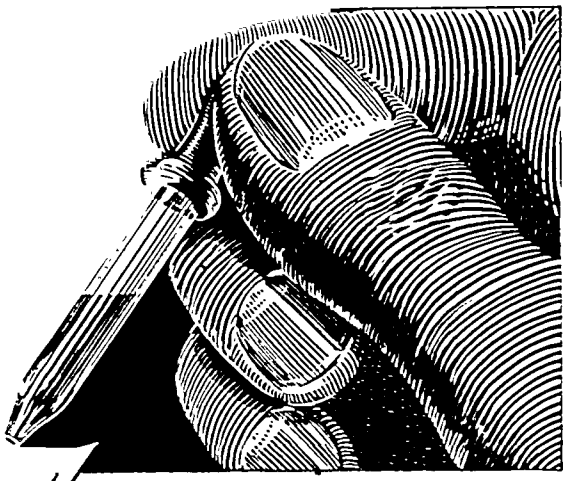
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*Swartz and Reilly, "Diagnosis and Treatment of Skin Diseases", pp. 66-67.

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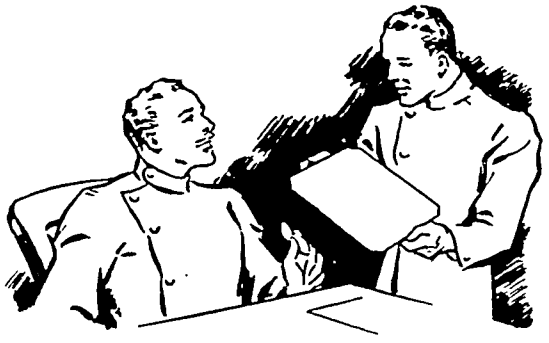
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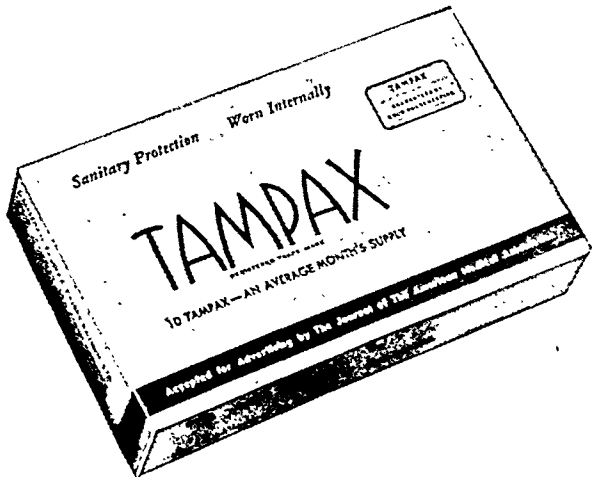
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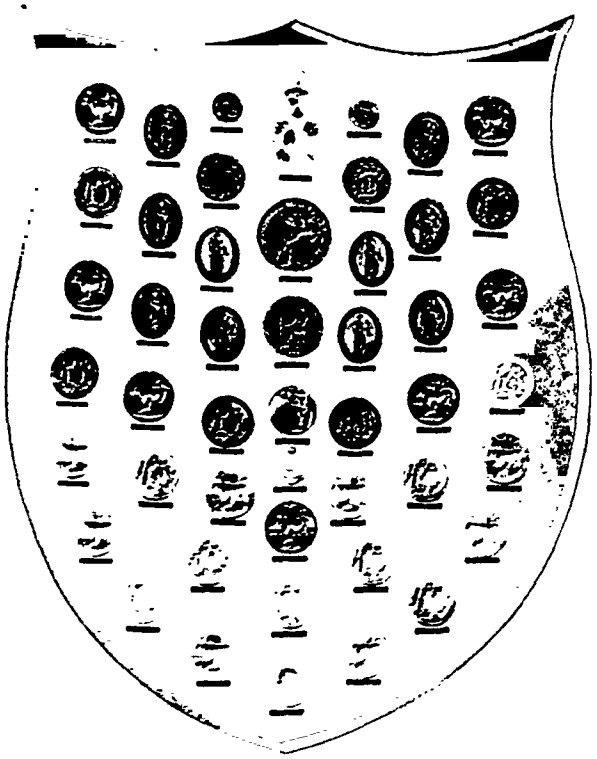
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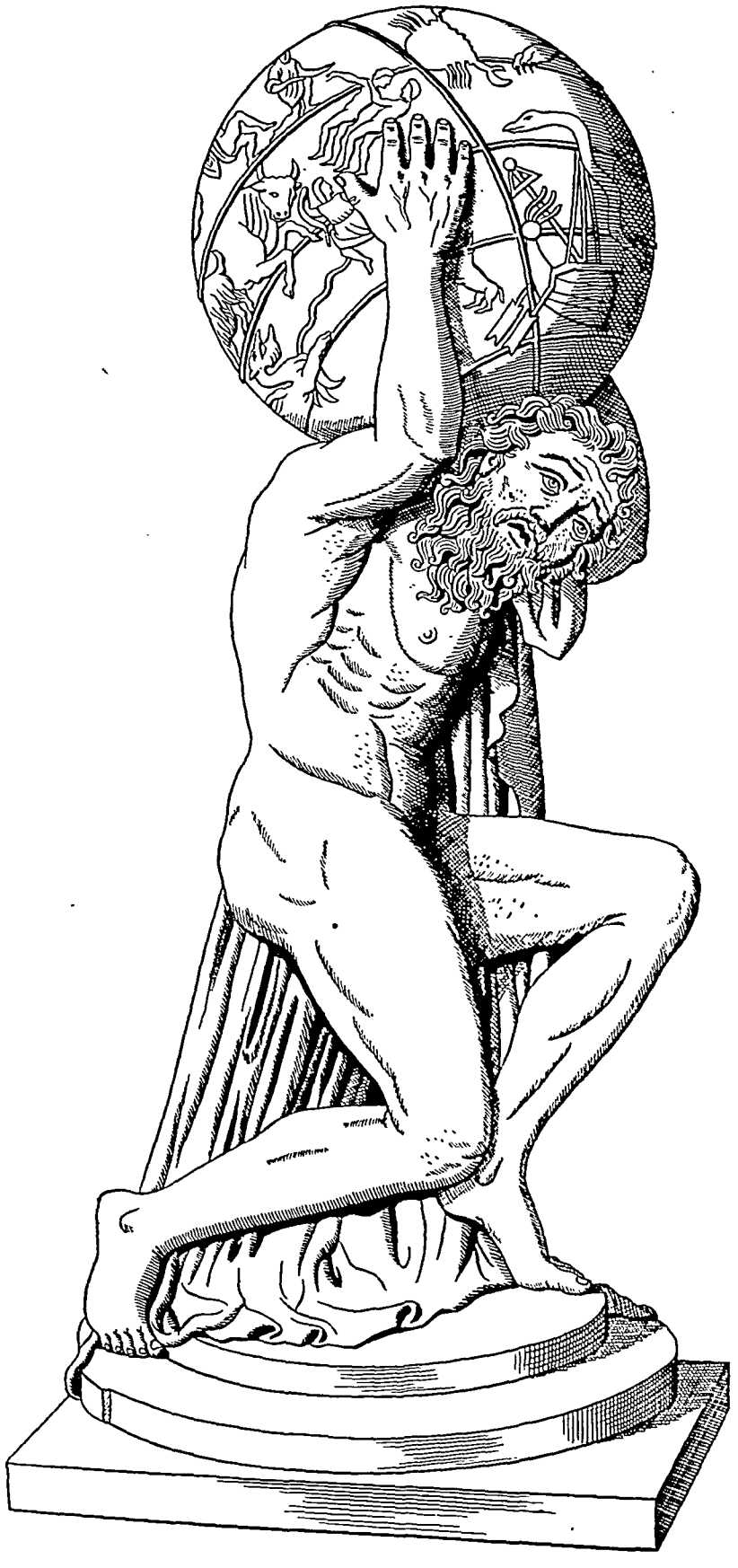
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He sincerely regards his work as indispensable to the success of the business, and recoils from anything that he feels might take him away from his job.

That's why it usually is so difficult to get such a man to pay proper attention to his health, even though he is troubled by persistent signs and warnings that something is wrong.

For at any suggestion that he heed these warnings—that he see his doctor—he says: "Yes, yes, I suppose you're right. But what if the doctor should order me to stop work for awhile? Who'd take care of my job? What would happen to the business?"

And the irony of it is that by his attitude he is inviting the very thing he fears! For one of the surest ways of encouraging a *serious* sickness is to neglect a seemingly *small* one. Heart and other organic diseases, stomach ulcers, and nervous disorders—diseases to which men in the so-called "prime of life" are particularly susceptible—thrive on neglect.

When you see your doctor he may, to be sure, prescribe a short rest. But isn't that better than a *forced long* rest later? He might say: "Take things a little easy. Leave the office an hour earlier at night." But isn't that better than driving on relentlessly until you're *carried* out of the office?

Let us hope, of course, that your disturbance will turn out to be a minor one—and that its treatment will be simple, its correction rapid. But whatever is wrong, you'll be better off if you start correcting it before it becomes really serious. The most sensible thing you can do, therefore, is to see your doctor *now*.

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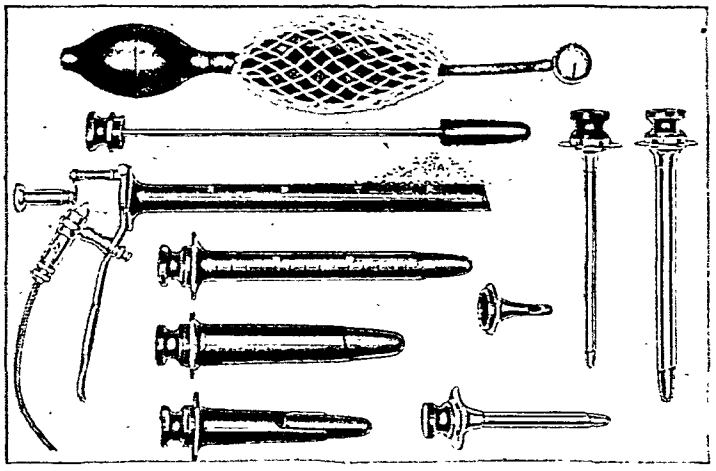
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*BANCROFT, Pennsylvania Medical Journal..November 1936

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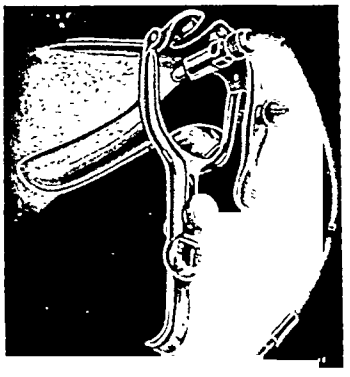
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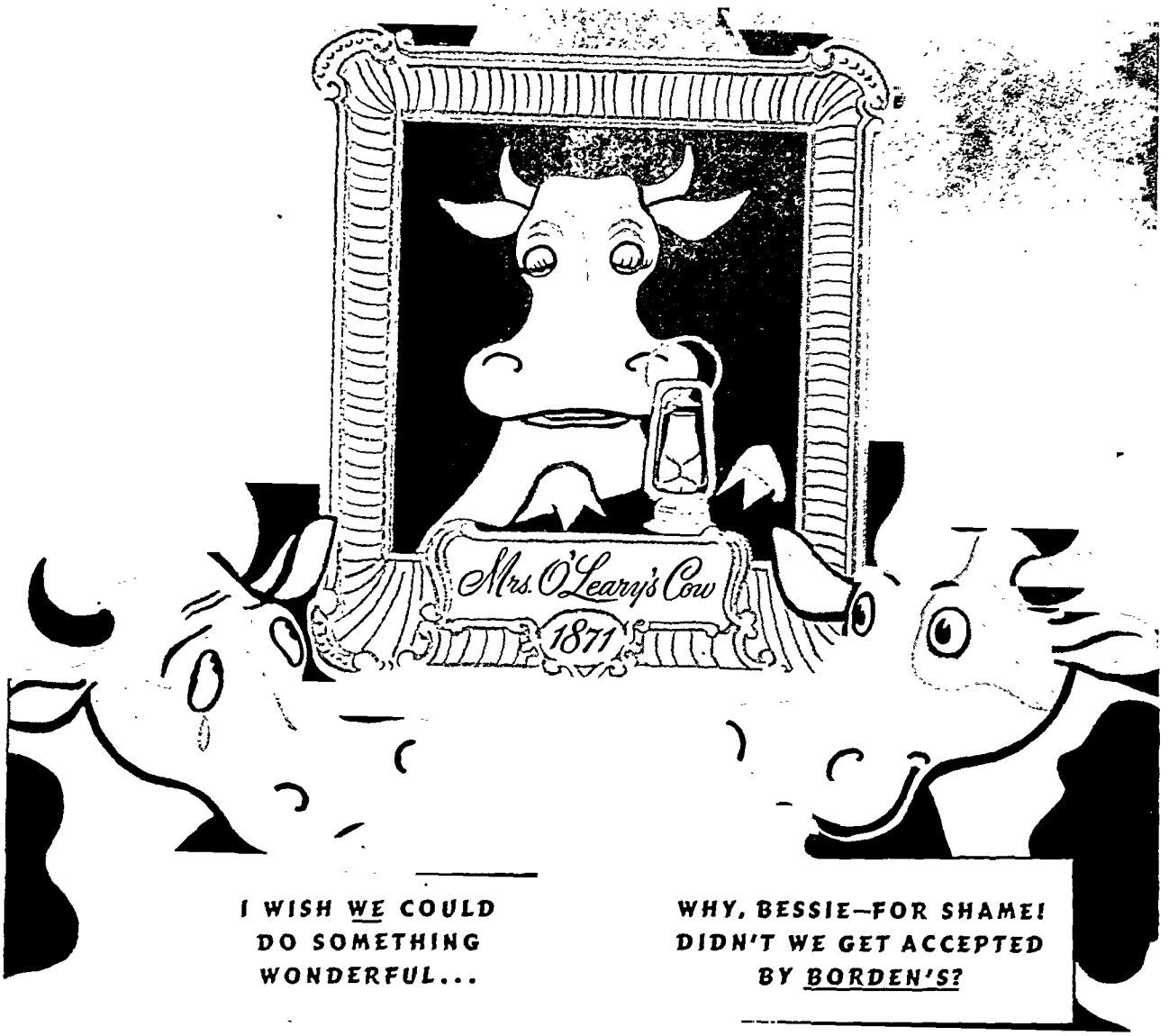
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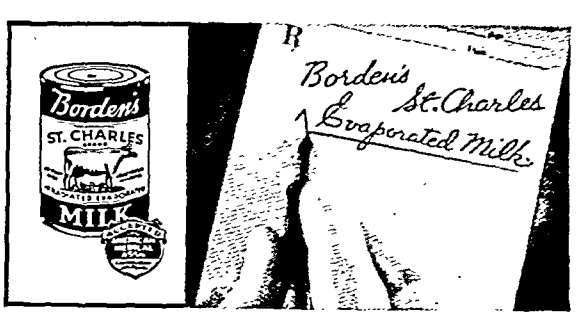


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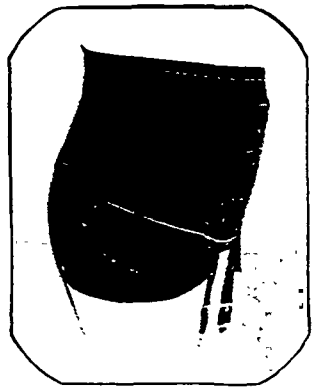
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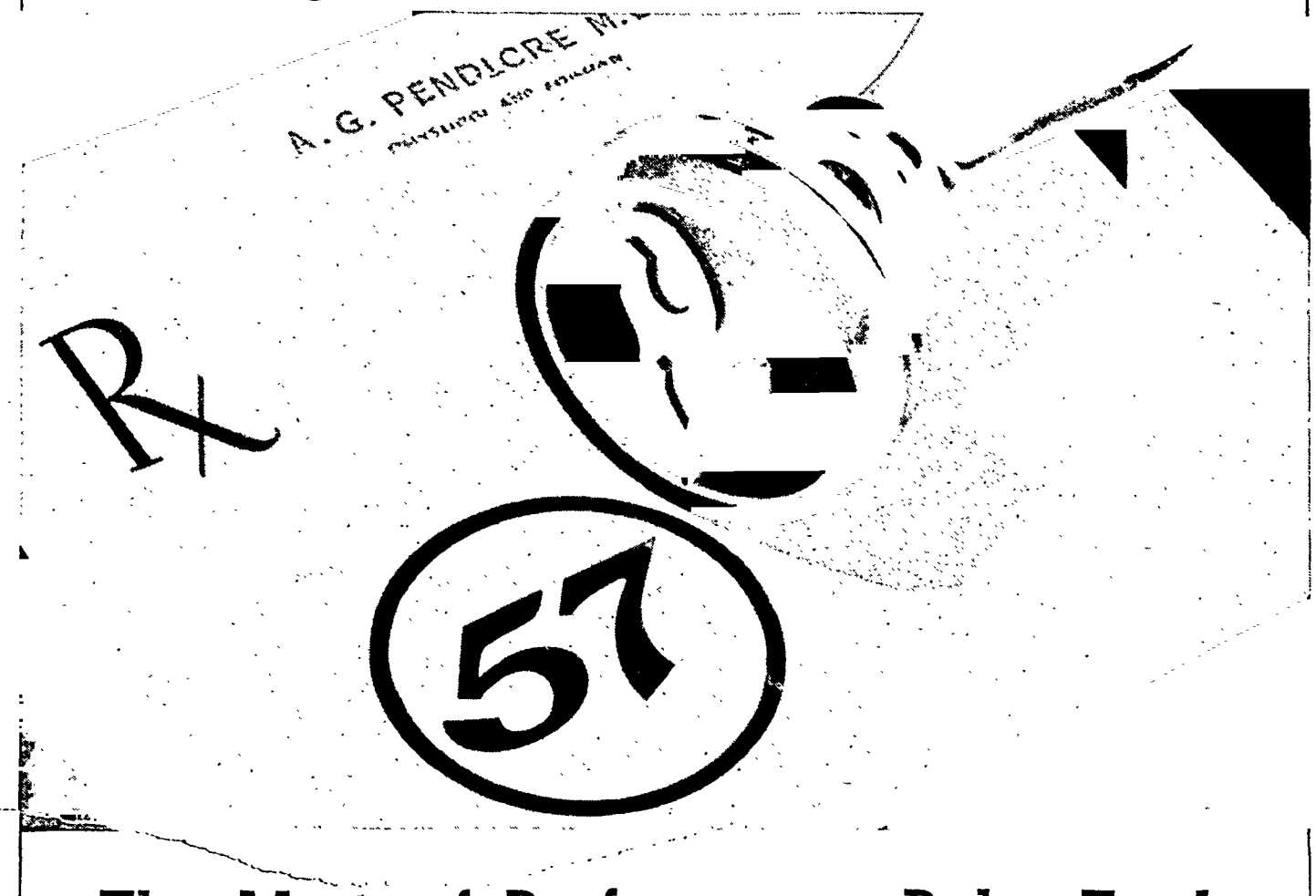
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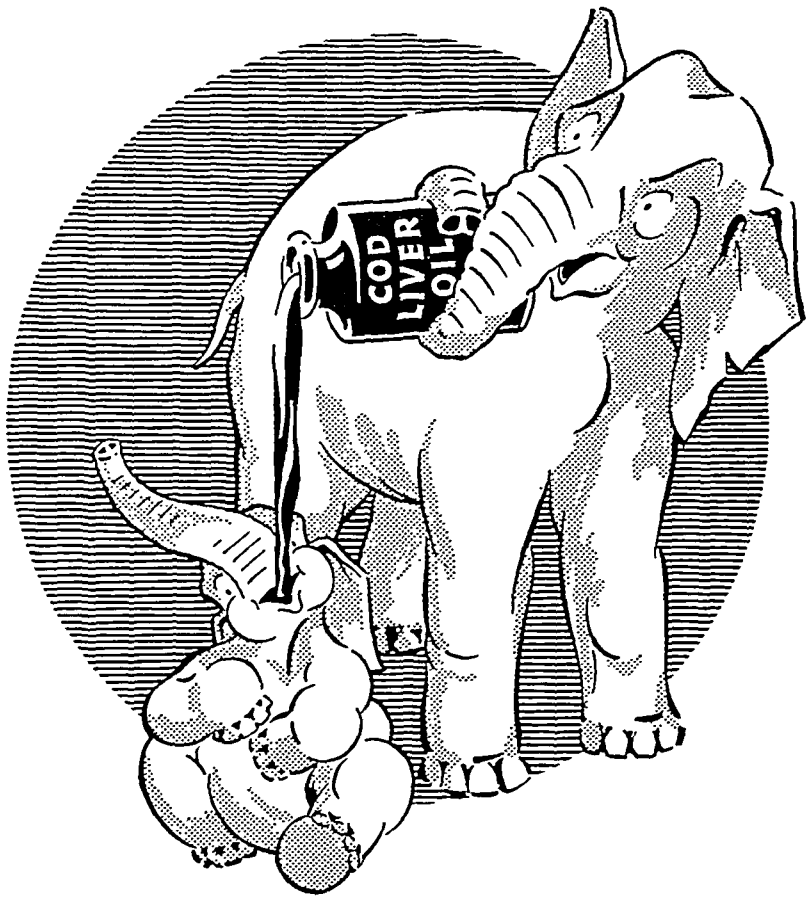
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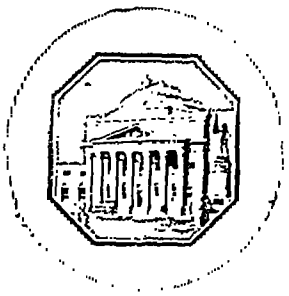
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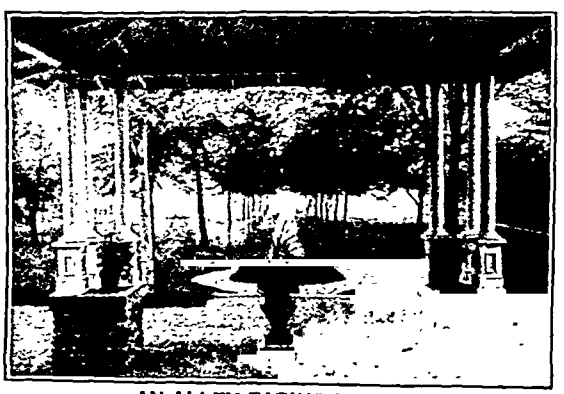
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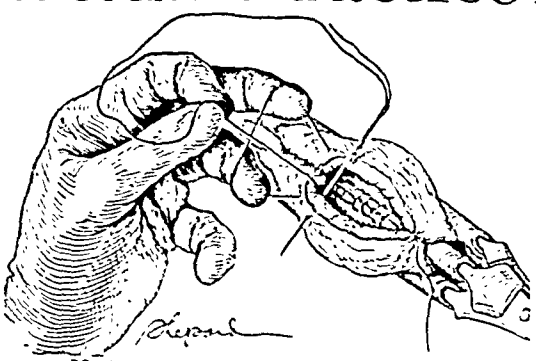
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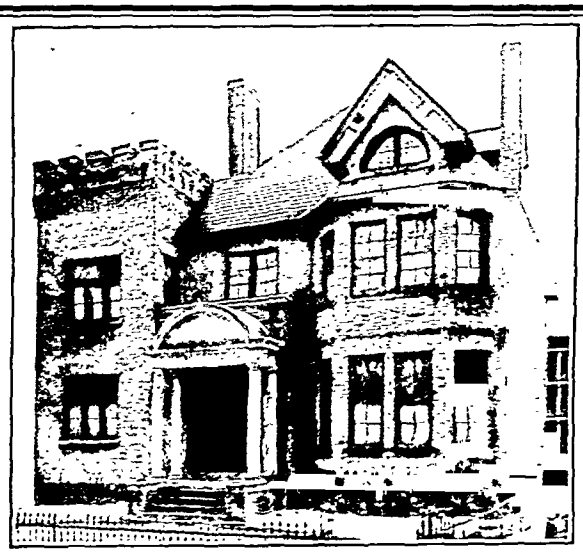
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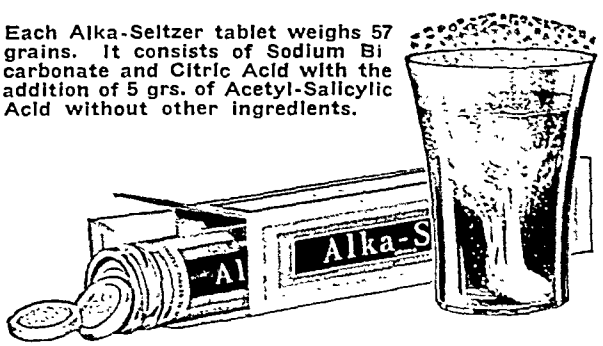
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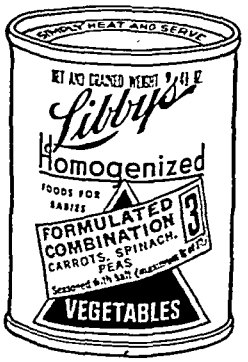
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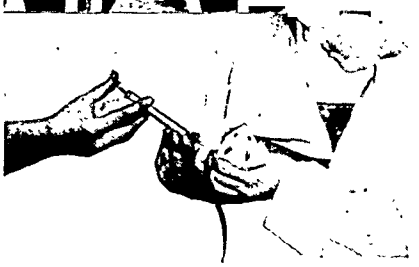
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1. Kahnt and Doisy: Endocrinology 12:760, 1928.
2. Deckert, Mulhall and Swiney: J. Lab. & Clin. Med. 23:85, 1937.

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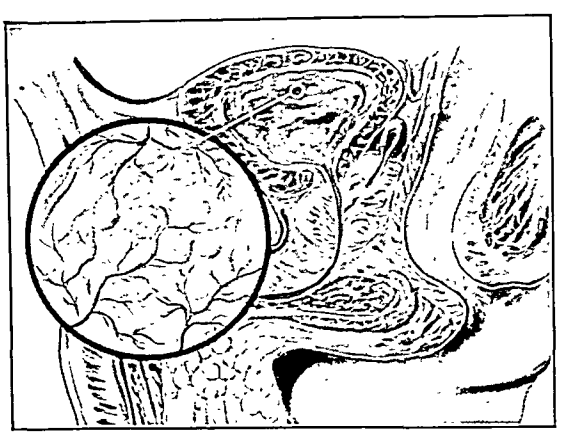
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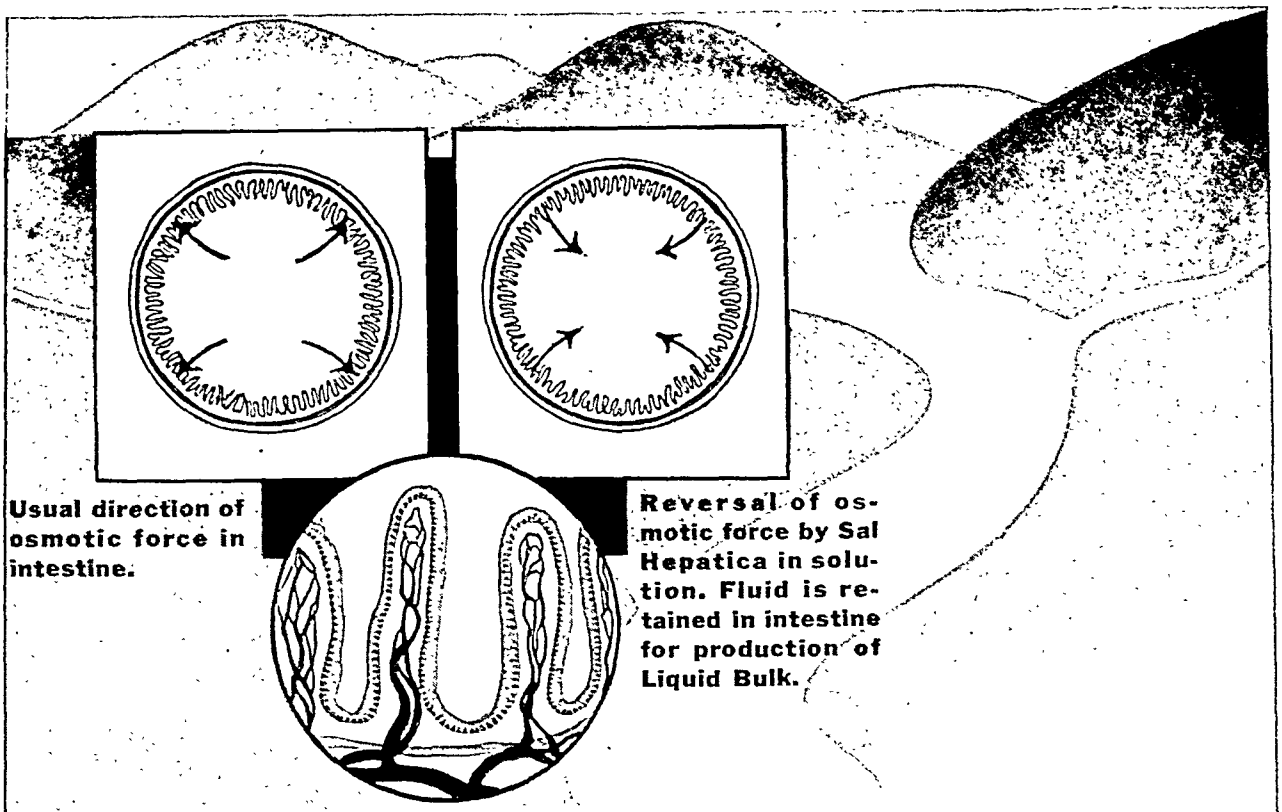


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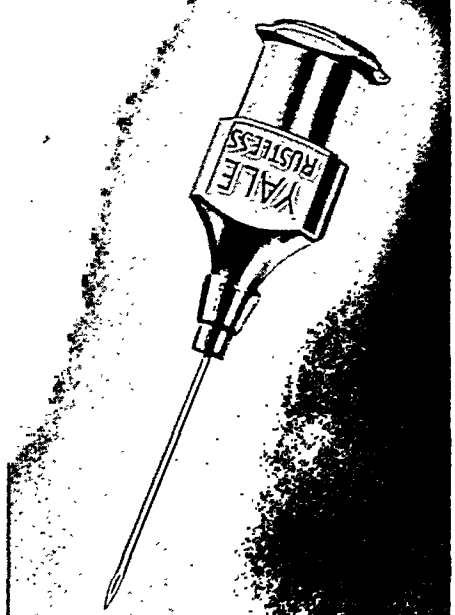
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Vol. 38 APRIL, 1938 No. 4

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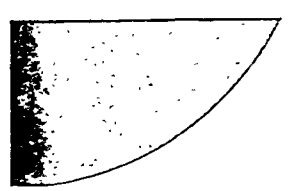


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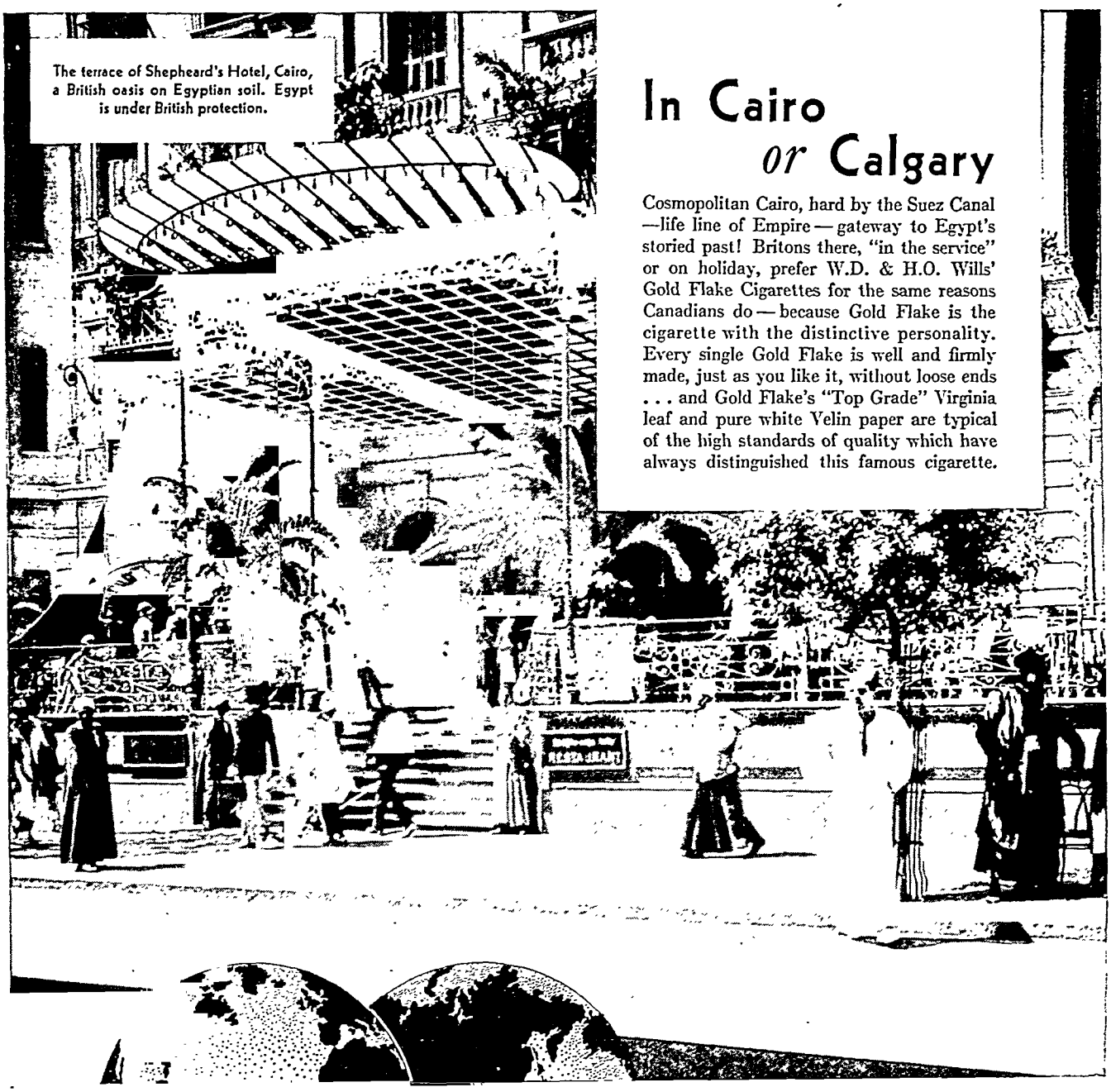
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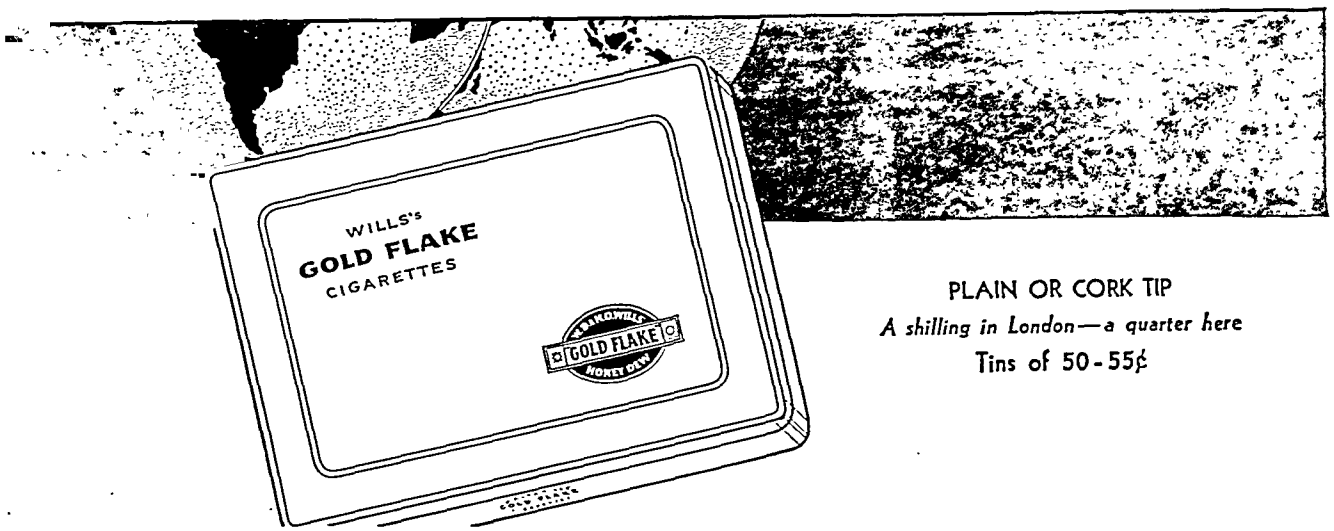


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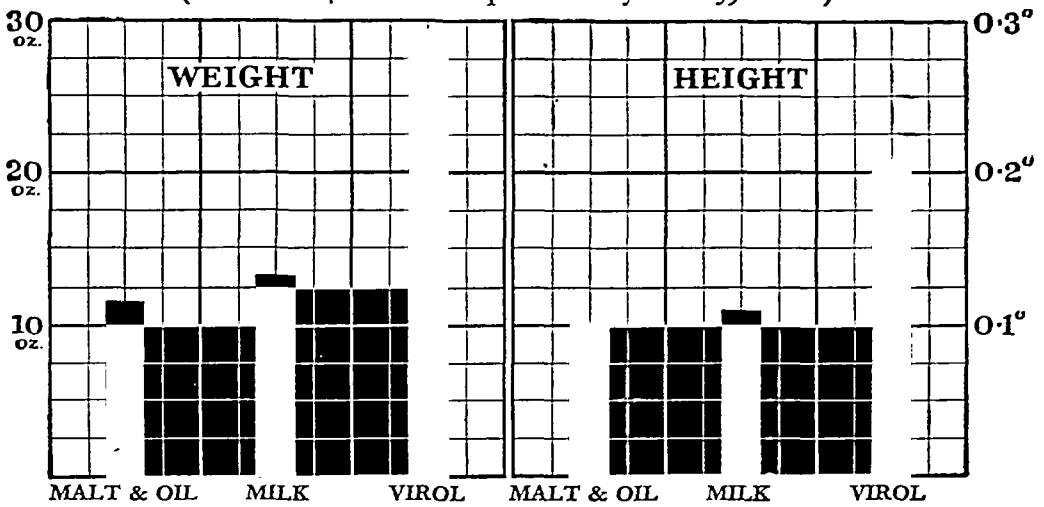
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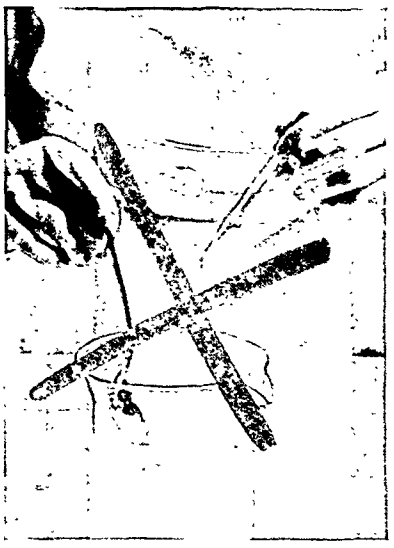
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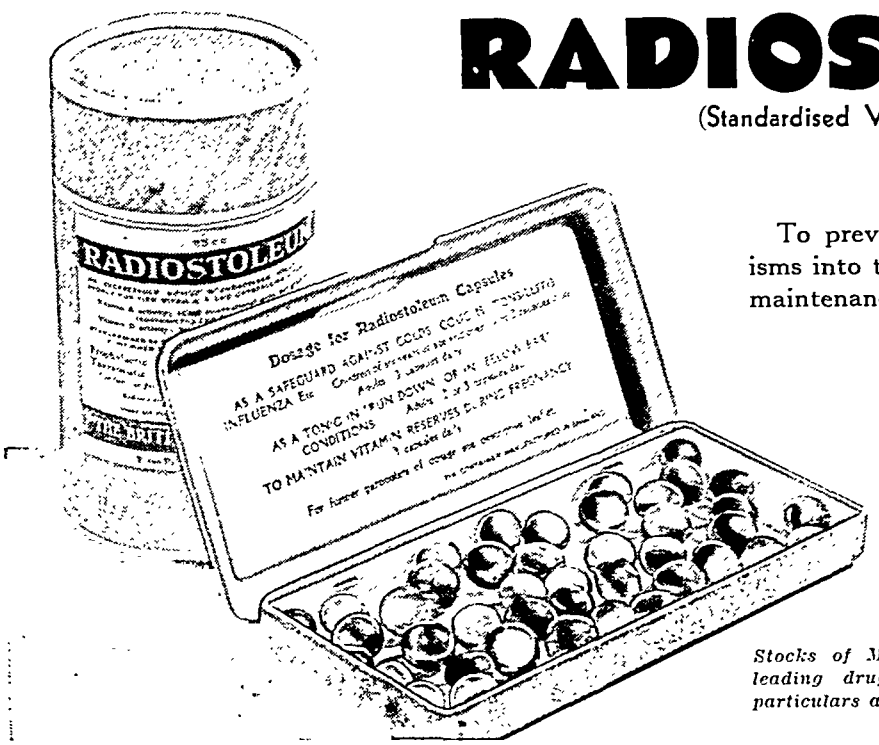


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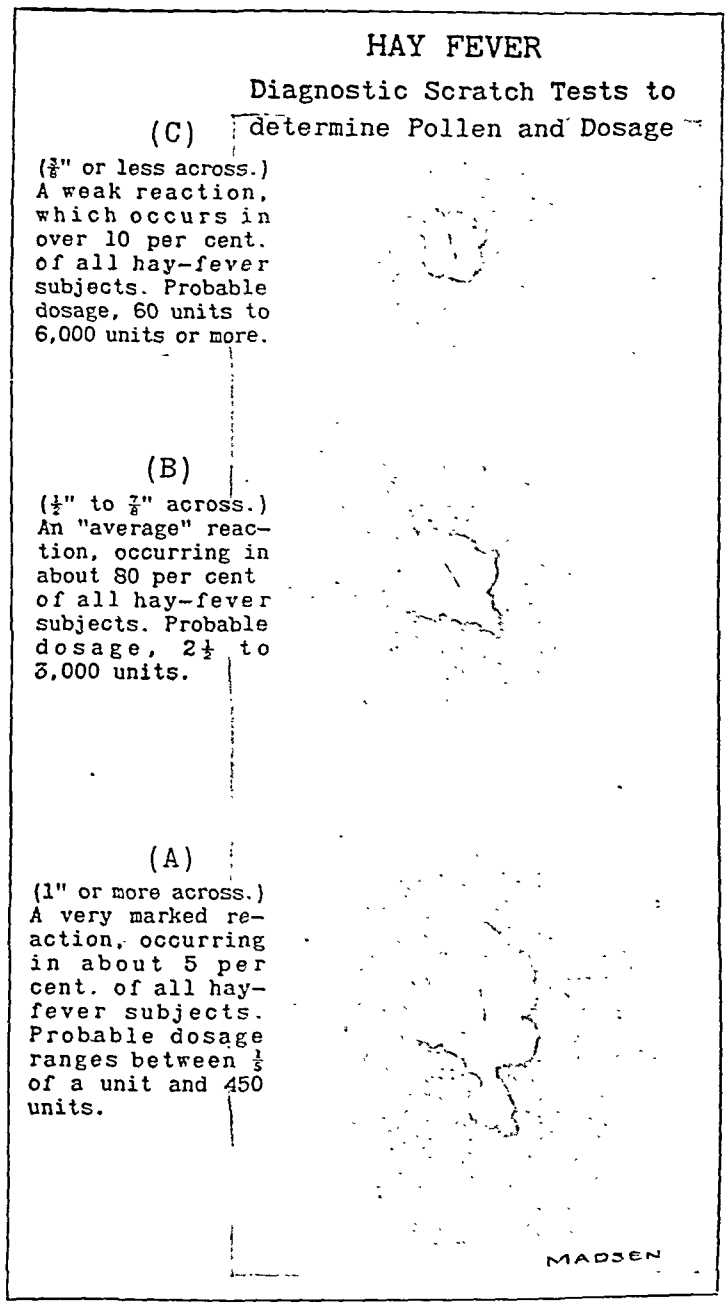
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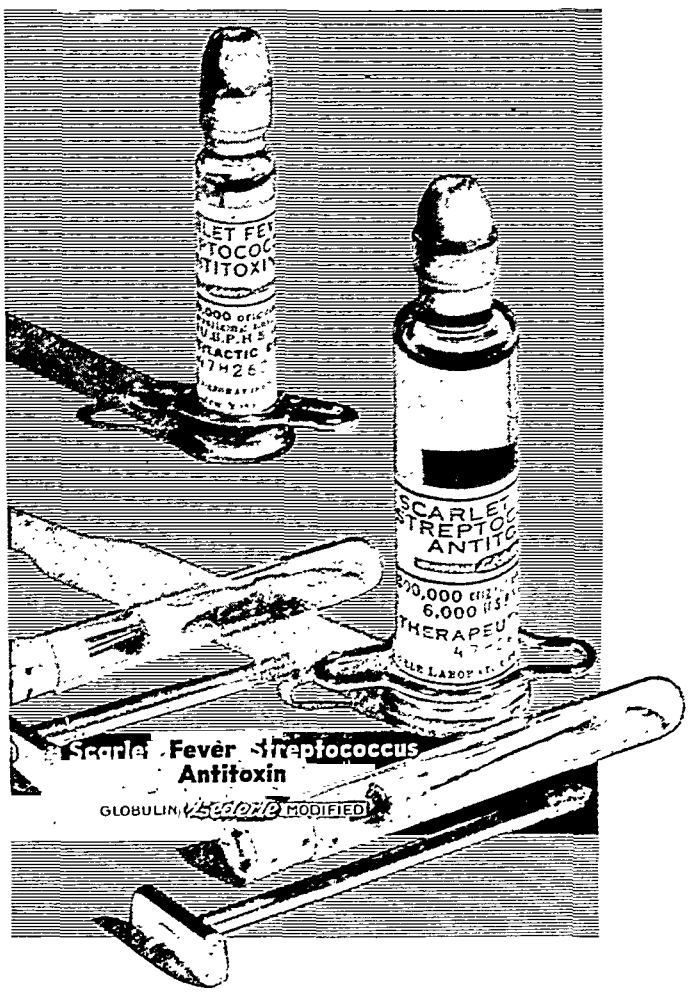
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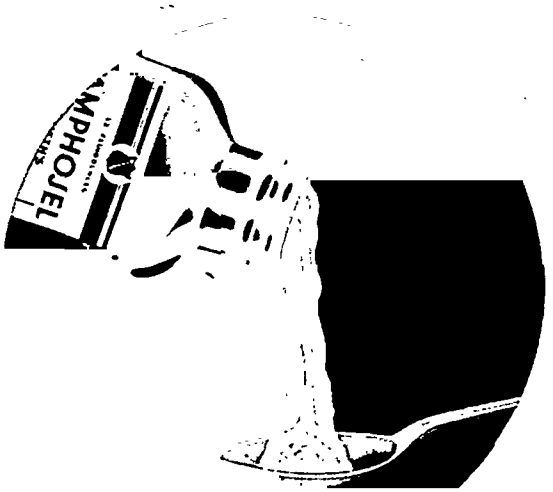
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GENOSCOPOLAMINE

This drug, which is called Genoscopolamine, we owe to the work of Polonovski, Combemale and Nayrac. It is the N-oxide of Scopolamine, the formula of the hydrobromide being $C_{17}H_{28}O_5NHBr$. In this compound, which is one of the series of genalkaloids, oxidation of the amine group has the effect of lessening toxicity by retarding absorption in the central nervous system. The pharmacological properties are not only maintained, but are even enhanced. Genoscopolamine has the great advantage over Scopolamine of being 200 times less toxic, the lethal dose in animals being 0.25 gm. per kilo. of weight, as against 0.001 gm.

Therapeutically, in Parkinson's disease and the Parkinsonism of encephalitis lethargica, the results are striking, being more definite, more general, and more lasting with Genoscopolamine than with Hyoscine. This is, no doubt, partly due, at any rate, to the fact that, being less toxic, Genoscopolamine can be employed in larger doses and for longer periods.

The following cases may be quoted in illustration:—

CASE I.—Female, aged 25. Severe post-encephalitic Parkinsonism; fixed attitude, rigidity and tremor, loss of automatic movements. Given 5 mgm. of Genoscopolamine daily in the form of drops. Rapid improvement, both subjectively and objectively; rigidity and tremor less, and patient able to move her arms. Hypersalivation disappeared after the tenth day.

CASE II.—Female, aged 30. Post-encephalitic Parkinsonism. 2 mgm. of Genoscopolamine given daily, in the form of drops. Immediate improvement; rigidity less, tremor disappeared. On increasing the dose to 3 mgm., patient improved still more, moving about quite easily. Then, unknown to her, the drug was stopped; the symptoms reappeared, but disappeared on again giving the drug. Hypersalivation ceased after the eighth day.

CASE III.—Male, aged 32. Very severe Parkinsonism. Complete rigidity and fixity of movement. Given 3 mgm. Genoscopolamine daily; remarkable improvement after two days. The patient became cheerful, and could walk about and move his arms. On stopping the drug, the symptoms recurred, but disappeared again on re-administering it.

CASE IV.—Female, aged 35. Typical Parkinsonian syndrome, no previous history of encephalitis lethargica. Treated by all the usual, including Hyoscine, without improvement. On 3 mgm. daily of Genoscopolamine, hypersalivation immediately became less, and the movement free. The patient is still taking 2 mgm daily, and is able to follow her occupation.

CASE V.—Female, aged 53. Parkinsonian syndrome, no previous history encephalitis lethargica. Treated by 5 mgm. of Genoscopolamine daily. At first the patient became mentally confused, but this soon disappeared. The tremor has been much less marked for the last four months. The condition improved still more on associating 3 mgm. of Genhyoscyamine with 2 mgm. daily of Genoscopolamine.

Other cases of a similar nature could be quoted.

SUMMARY

Genoscopolamine is a drug which has remarkable therapeutic effects on the various components of the Parkinsonian syndrome

(1) It relieves muscular hypertonia and rigidity, and restores the use of the limbs.

(2) It attenuates the tremor, often to a considerable degree.

(3) It is the most effective drug for relieving the distressing hypersalivation.

(4) It has some, though, inconstant, effect on the disturbances of automatic action. These are notoriously rebellious to treatment, but if taken early are often much improved by Genoscopolamine.

TOXIC SYMPTOMS

Secondary effects are rarely observed, and are seldom of any importance. Occasionally, in susceptible patients, there may be some mental confusion or slight excitability, with congestion of the face and visual hallucinations. Diarrhœa, too, may be a troublesome symptom. These disturbances, however, are usually only seen when relatively high doses (4-5 mgm. in one dose) are prescribed. They do not recur, and seem to be associated with the first dose only.

With Genoscopolamine there is no risk of habit-formation. It is unnecessary to increase the dose to maintain a therapeutic effect. Indeed, when, after a little trial, the correct and necessary dosage for the patient has been discovered, it may be continued indefinitely, or even reduced a little.

DOSAGE

The average dose is 3-4 mgm. daily, although this may be increased if necessary.

It is best to give Genoscopolamine in fractional dose of 1-2 mgm. two or three times through the day. One can thus give 1 mgm. three times daily or 2 mgm. night and morning or 2 mgm. in the morning, and one more in the afternoon and evening; the morning dose should be the largest given.

PACKING

Genoscopolamine is put up as the hydrobromide, in the following forms:—Granules of ½ mgm. The dose is 4-8 granules daily.

Drops of a 1.5 per 1000 solution. The dose is 40-80 drops daily, in two or three fractional doses.

Ampoules containing 1 mgm. Give one ampoule subcutaneously if an immediate effect is desired. The dose may be supplemented by giving the rest of prescribed daily amount as granules or drops.

For surgical use, and for special emergencies, where it is desired to take advantage of the anæsthetic and hypnotic properties of Genoscopolamine, this is put up in form of ampoules containing 3 mgm. to the c.c.

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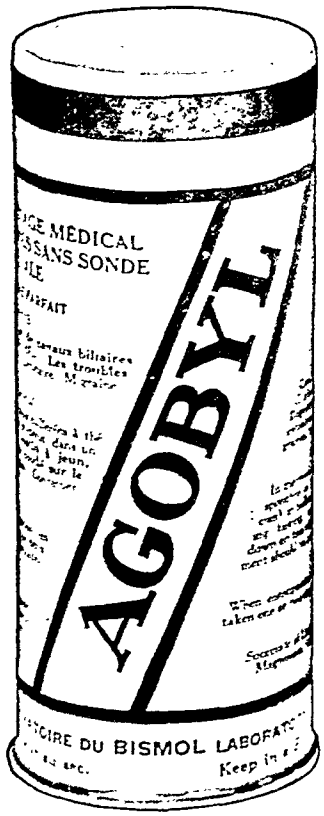
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RECONSTRUCTION OF THE VALVES OF THE HEART

BY GORDON MURRAY, F.R.C.S.(ENG.), F. R. WILKINSON, M.D. AND R. MACKENZIE, M.D.
Department of Surgery, Toronto General Hospital, Toronto

THE first descriptions of surgical operations on the heart are contained in the writings of Cappelen in September, 1895, of Farnia in March, 1896, and of Rehn in September, 1896, when they described the repair of wounds of this organ. Since that time many wounds of the heart have been sutured, and on many occasions foreign bodies have been removed from its wall.

Samways, a British veterinary surgeon, in 1898 printed an article in which he suggested that "some of the severest cases of mitral stenosis will be relieved by lightly notching the mitral orifice". In 1902 Lauder Brunton suggested "that stenotic lesions of the mitral valve might be susceptible of surgical intervention". His ideas undoubtedly resulted from experimental observations of artificially created valvular lesions by Becker in 1872, Klebs in 1875, Cohnheim in 1877, Timofejew in 1888, and Rosenback in 1899. The contributions of Haecker in Germany and of Cushing and Branch, in collaboration with Henry and Hever, which appeared in 1907, were the first to report recovery in experiments in which the cardiac valves were cut. Bernheim in 1909 and Schepelmann in 1912 published series of experiments which were designed to produce constriction of the heart valves. Contributions by Jeger, Carrel and Tuffier also contain much information on this field of experimental surgery. In 1922 Allen and Graham constructed a new instrument in the form of an endoscope by which the valves could be divided under direct vision. Cutler and Beck continued experiments of this nature, with and without direct vision of the valves. The first clinical case was operated upon by Doyen in 1913 but the patient did not recover. In 1914 Tuffier operated upon a case of aortic stenosis and since 1923 Cutler and Beck have operated upon several cases with their cardiovalvulotome.

The following work is a continuation of experiments on cardiac circulation which were started in the University of Toronto in 1932. The present series of experiments on intracardiac surgery were started in 1936, when resected heart valves were successfully replaced by venous grafts.

The lateral cusp of the mitral valve was resected after a modification of the method described by Cutler. The approach to the valve was through the apex of the auricle. All the eight control animals died within 6 days and several of them within 12 hours. In 8 other animals a similar resection of the lateral cusp of the mitral valve was carried out. In 6 of these the valve was replaced immediately and 2 of these animals are alive and perfectly well, now 6 months following the operation.

In preliminary dissections the bundle of His was dissected out and the surface markings for its course defined so that it would not be injured during the operation. The cardiovalvulotome described by Cutler, with the blade closed, was passed through a small opening in the apex of the left auricular appendix. A purse-string suture which had been placed about this area before the incision was made was tightened slightly to prevent leaking of blood. The instrument was passed through the mitral ring and the blade allowed to open. The lateral cusp of the valve was picked up in the notch of the instrument, and when the blade was closed a piece of valve averaging 8 x 10 mm. and some chordæ tendineæ were excised and the instru-

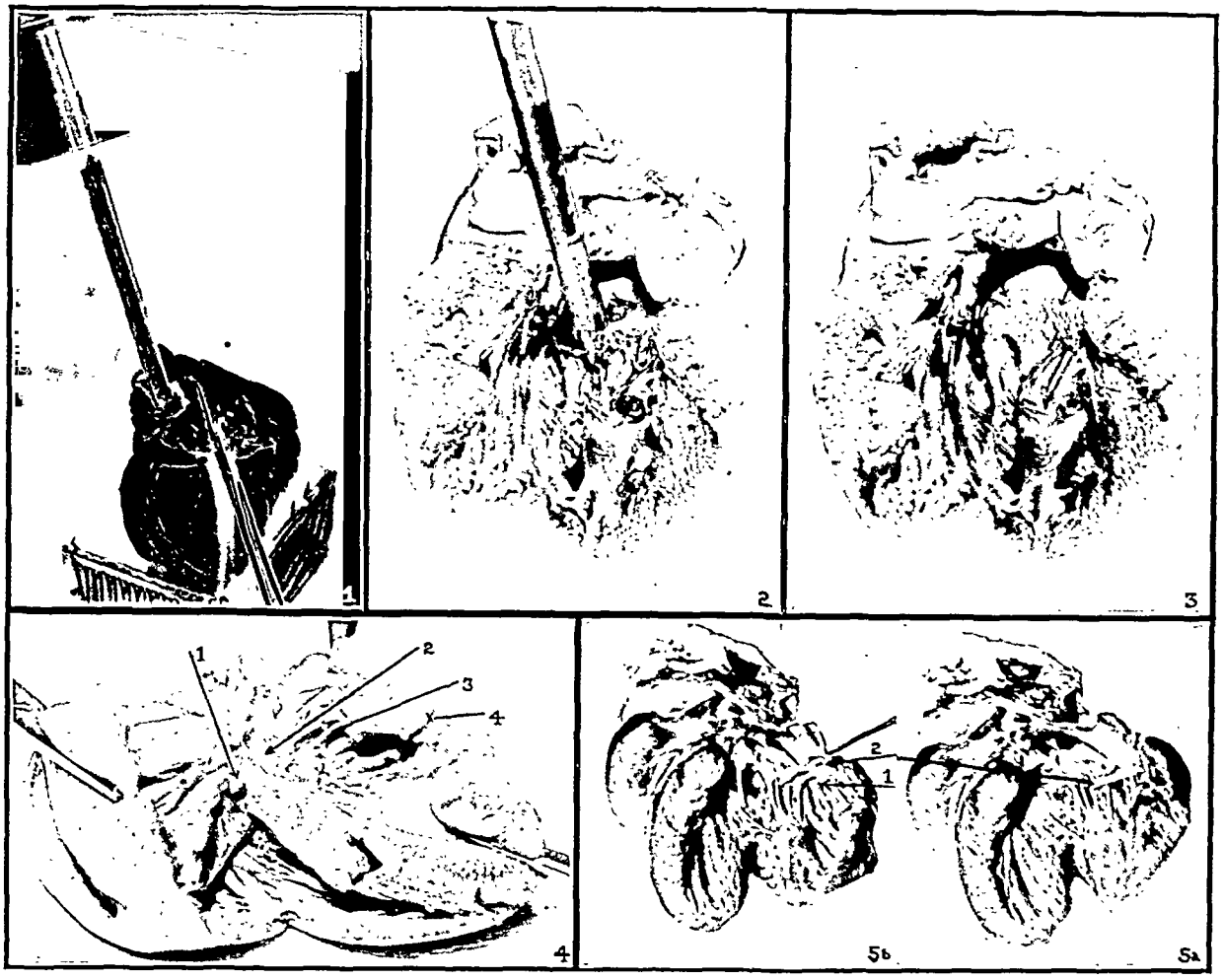


Fig. 1 (S 1083).—The valvulotome in place through the apex of the auricle. **Fig. 2** (S 1089).—The valvulotome in place grasping lateral cusp of the mitral valve. **Fig. 3** (S 1090).—Part of valve missing, following resection operation in dog No. 2 of the control series. The part of valve removed measured 8 x 13 mm. **Fig. 4** (S 1001, dog No. 5).—With heart opened showing remaining cusp of mitral valve and the replaced valve. (1) Replaced valve; (2) normal cusp; (3) chordæ tendineæ; (4) cut wall of left ventricle. **Fig. 5a** (S 1094).—Replaced valve in position. **Fig. 5b** (S 1095).—Shows (1) gap where part of valve was removed; (2) replaced valve retracted.

ment withdrawn. The opening in the auricular appendix was closed with a ligature. Immediately following this there was evidence of increasing dilatation of the left ventricle and auricle, with increasing cyanosis of the cardiac muscle and of the dog's tongue.

About 3½ inches of external jugular vein were excised and cleared thoroughly of surrounding fat. The section was turned inside out so that only its endothelial lining would be in contact with the blood stream. A silk suture was attached to each end, and with one of these the vein was drawn into a cannula large enough to receive it. The cannula was passed through the anterior heart wall, lateral to the descending branch of the left coronary artery, at a point which had been determined previously on dissection of many hearts. The point selected on the anterior wall was about ⅜ of an inch on the ventricular side of the annulus fibrosus. The cannula was passed across the cavity of the heart, to emerge on the posterior surface of the left ventricle about the same distance from the annulus fibrosus. The suture on the end of the vein was grasped and the cannula withdrawn, leaving the vein across the cavity of the heart. The new valve was thereby placed across the cavity of the heart so that it would lie in the line of the resected valve and in the position of greatest advantage as determined by many experiments. Both ends of this new valve were sutured to the epicardium of the left ventricle, avoiding damage to the larger branches of the coronary artery. The new valve was sutured in position so that it had very slight tension. This tension was shown by experiment to allow of sufficient movement of this structure within the heart cavity, so that it would bulge during



Fig. 6a (dog No. 2).—Replaced valve in position. Fig. 6b (dog No. 2)—Outer surface of heart. (1) End of valve on surface of heart; (2) other end of venous graft. Fig. 7.—Shows (1) remaining cusp of mitral valve; (2) replaced valve. Fig. 8.—Shows (1) normal remaining cusp; (2) replaced valve.

ventricular systole into the opening left by the resected valve. In none of these experiments was there a great loss of blood. Immediately following the placing of the new valve the increasing dilatation and cyanosis of the heart ceased, the heart rate improved, and the colour of the dog's tongue improved.

During the resection of the valve in some of both groups the ventricle began to fibrillate and we were unable to restore normal rhythm. If, however, the resection of the valve was carried out successfully all the animals survived the operation of placing the new valve. Four died of infection, either of the pericardium or pleural cavity or lungs. Two died on the table of ventricular fibrillation, and in these there was no opportunity to place the new valve in position. In the remaining 6 animals, where the valve was replaced satisfactorily, 4 died of infection in from two to ten days. The two surviving animals (Figs. 4 and 5) are quite well, without œdema, or signs of heart failure, and can take their part with the other dogs in the runway. There is a soft systolic murmur in both these hearts.

The Banting Foundation has generously supported this investigation by making grants to F.R.W. and R.M. This investigation has been carried on in conjunction with the work on heparin. The expert assistance of Mr. Walter Cowan has been of the greatest value.

OVARIAN EXTRACT IN PRURITUS.—L. N. Elson considers that pruritus vulvæ and pruritus senilis are degenerative neuritides, and, on the theory that the ovaries form specific nerve-regenerating hormones, has for sixteen years been treating cases of these diseases with an extract of whole ovary. He gives 5 grains three times daily one hour before meals on the first day, two doses the second day, and one dose the third day, continuing the same sequence for many weeks. He finds the results excellent in both sexes. He uses the same treatment for brachial neuritis and for the atrophic arthritides of the female and male climacteric, and in the aged, with good results. For local application he recommends saturated solutions of sodium bicarbonate or magnesium sulphate as compresses, or camphor and menthol, 2 per cent each, in liquid paraffin.—*Urol. cutan. Rev.*, October, 1937, p. 713. Abs. in *Brit. M. J.*

URINARY OBSTRUCTION IN CHILDREN*

BY DAVID W. MACKENZIE AND MAX RATNER

Montreal

DISEASES of the genito-urinary tract in infants and children are sufficiently common to rate them among the important lesions of early life. Repeated studies have revealed that children are subject to practically the same urological diseases as adults. However, the most common lesions found in the urinary tract of the young are obstructive in type, and the great majority of them result from anomalous development. When one realizes that the incidence of congenital anomalies in the genito-urinary tract is higher than in any other system of the body it can be appreciated why the greatest field of urology today lies in the early diagnosis and treatment of these abnormalities.

The study of urological disease in children is not new, yet the importance of a complete urological investigation in the young has not been fully appreciated by the medical profession in general until quite recently. We have failed consistently to realize the gravity of persistent urinary complaints and findings. In the past few years there has been a beneficial change. Internists and pædiatricians have been very willing to cooperate with the urologists, with the result that today many more children are being examined urologically than ever before. Moreover, all children's hospitals of repute have come to realize the importance of genito-urinary diseases in children, and have established urological services.

Any obstructive lesion in the genito-urinary tract is of prime importance because of the back pressure and destructive changes that it eventually produces on the renal parenchyma. It is also an important factor in causing urinary stasis and infection. If the obstructive lesion is not removed the destructive process goes on until the kidney or kidneys are destroyed. The importance of recognizing such obstructing lesions early is apparent.

For the sake of emphasis we wish to discuss briefly two specimens that were found in young children.

The first one was removed at operation (Fig. 1). It shows a destroyed kidney with a large dilated ureter. There are three definite obstructive lesions present. One is at the uretero-pelvic junction, another at the junction of the middle and lower thirds of the ureter, and a third (not shown on the photograph) near the ureteral orifice. We feel justified in saying that if the obstructions had been recognized at an early date proper procedures could have been carried out, thus preventing the complete destruction of both kidney and ureter.

The second specimen was found at autopsy (Fig. 2). The child, male, aged 9 years, was admitted to the hospital in uræmia. A diagnosis of bilateral pyonephrosis and pyo-ureter was made. He died shortly after. The post-mortem examination revealed completely destroyed kidneys, large dilated ureters, trabeculations and diverticula of the bladder, and finally a cyst in the posterior urethra. Apparently this cyst caused an obstruction which ultimately destroyed the urinary tract. This case too stresses the need for early recognition of urinary obstruction. It is reasonable to assume that the urinary tract might have been saved from complete damage if the child had undergone an urological examination early in life.

Campbell, in a recent article on urinary obstruction in children, emphasized this very point by stating that the greatest field for preventive medicine today lies in the early recognition and treatment of these obstructive lesions in the young. It is of interest to emphasize at this time the prevalence of multiple obstructive lesions in the same organ. It is not uncommon to discover at operation or on the autopsy table two or three varieties of congenital lesions along the course of the one ureter. This possibility must always be borne in mind by the surgeon (Fig. 3).

Urinary obstruction in children may be divided into two groups: (1) upper urinary tract obstructions; (2) lower urinary tract obstructions. In the upper urinary tract group the obstruction may be encountered anywhere along the ureter, including the ureteral orifice. The lower urinary tract lesions, on the other hand, include all obstructions occurring anywhere from the external urethral meatus to the neck of the bladder.

OBSTRUCTIONS OF THE UPPER URINARY TRACT

1. *Obstruction due to aberrant vessels.*—Although vascular obstruction of the ureter in children is not an uncommon occurrence, yet the condition is frequently unrecognized and rarely diagnosed. The aberrant vessels which

* From the Departments of Urology, Royal Victoria Hospital and Children's Memorial Hospital, Montreal.

may be arteries, veins, or both, usually cross anteriorly to the ureter. The most common site of these is in the upper portion of the ureter, although cases have been observed where the vessels cross the lower portion of the ureter near the bladder. It will be appreciated at this point that not all anomalous vessels that cross the ureter cause urinary obstruction. Several cases of aberrant vessels have been observed at autopsy and on the operating table without any evidence of hydronephrosis or hydroureter.

There has been considerable controversy re-

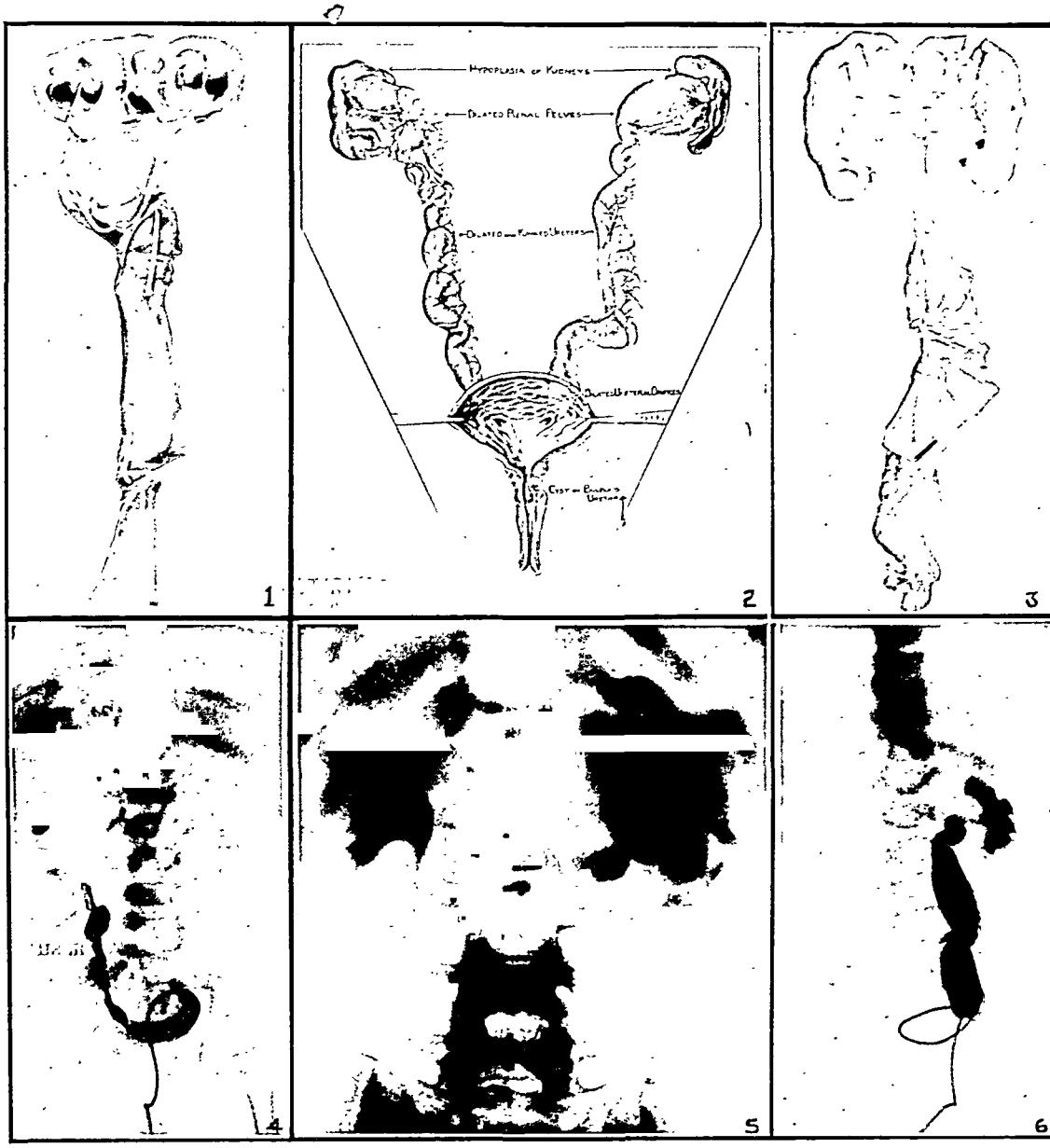


Fig. 1.—A destroyed kidney and a large dilated ureter removed from a young child. There are two definite obstructive lesions shown. One is at the uretero-pelvic junction, and the other at the junction of the middle and lower thirds of the ureter. There was a third obstruction near the ureteral orifice (not shown on this photograph). Fig. 2.—Specimen removed at autopsy from a male child aged 9 years. Note the large dilated renal pelves and ureters; also the trabeculated bladder, and the presence of a cyst in the posterior urethra. Fig. 3.—A specimen removed from a young child illustrating the presence of several obstruction lesions in the same organ. Note (1) the narrowing at the uretero-pelvic junction; (2) the presence of multiple valve-like projections about the middle of the ureter; (3) a narrowing of the ureter as it enters the bladder. Fig. 4.—A large hydronephrosis and hydroureter. These were caused by several tight fibrous bands at the uretero-pelvic junction, and by three small aberrant vessels crossing the upper and middle portions of the ureter. Fig. 5.—A large hydronephrosis on the left side. This was due to an aberrant artery and vein, which were firmly adherent to the lower portion of the pelvis. Fig. 6.—A moderate hydronephrosis and a very large dilated ureter. This was due to a definite stricture just near the ureteral orifice.

garding the etiological relationship of aberrant vessels and hydronephrosis. It is believed by some that hydronephrosis results from direct compression of the ureter by the vessel; others are of the opinion that there is primarily some renal ptosis which in turn causes the aberrant vessel to compress the ureter. Quinby assumes that the pulsation of the aberrant artery against the ureter inhibits peristalsis and so causes stasis. The pathological picture depends upon the degree of obstruction and the length of time it has been present. In early cases a mild hydronephrosis is found; as the compression becomes more aggravated greater stasis results, until, finally, infection sets in and now there is a large infected hydronephrosis. Ultimately the entire kidney is destroyed.

The symptoms of obstruction from aberrant vessels are those of hydronephrosis, with or without infection. A common symptom is pain. This is usually present in one or other loin, and may be dull or colicky in character. At times it is confined entirely to the abdomen. Often it is associated with chills, fever, nausea and vomiting. More frequently the picture is suggestive of a gastro-enteritis. Recently we observed a case that resembled an acute intussusception. The symptomatology is characteristically intermittent. There may be long intervals of months or even years during which the patient may be absolutely free of symptoms. On the other hand attacks may occur very freqeuntly.

When infection sets in symptoms of cystitis appear. There is frequency, dysuria, and even hæmaturia. In late cases a mass may be felt in the loin, and when fever and chills are present severe tenderness may be elicited on palpation. Systemic symptoms may also be present. This of course results from long-standing urinary infection and diminished renal function. The child has anorexia, becomes anæmic, and loses weight. If a lesion is present on both sides uræmia may set in, with malaise, vomiting, and even stupor.

There are no signs or symptoms that are pathognomonic of obstruction by aberrant vessels; other forms of urinary obstruction may give the same clinical picture. However, a positive diagnosis can be made in many cases if all available data are studied. Thus the history, physical examination, urinalysis, kidney function tests, and, finally, cystoscopy and pyelography, are all important in the diagnosis. The pyelogram undoubtedly is the most important single aid. There is usually a hydronephrosis, with at times an abrupt transverse ureteral obstruction below it (Fig. 5). Occasionally the obstructing vessel causes a complete filling defect in the outline of the pyelogram. In extreme cases the pyelographic substance does not pass beyond the obstruction.

The treatment of this lesion is always surgical. Whether the procedure will be radical or conservative will depend of course on the condition of the kidney. If the obstruction has been present for a long time and has caused severe renal damage, then a nephrectomy may be necessary. On the other hand if the kidney has not been irreparably hurt a plastic operation will be the procedure of choice. The type of operation will depend on the size and position of the vessels. Small arteries may be sacrificed. If the aberrant vessel is too large some form of plastic operation is to be performed. There are several such procedures. Transplantation of the ureter into another portion of the pelvis has been recommended by some. Recently Young[15] described a plastic operation whereby the ureter is not severed. He simply removes a portion of the renal pelvis in front, and another portion behind. In so doing the renal pelvis and ureter are drawn away from the obstructing vessel, thus eliminating the necessity of severing any of these structures.

2. *Obstruction due to fibrous bands.*—This type of ureteral obstruction is also common, and is usually encountered at or near the ureteropelvic junction. The bands may assume a variety of forms. They may appear as longitudinal sheets extending from the renal pelvis downwards along the course of the ureter, or they may run transversely, pulling the pelvis and ureter towards the lower pole of the kidney. Not uncommonly these bands encircle the entire ureter, causing a definite and often complete constriction at that point. Several of these are associated with a definite stricture. Whether the latter is the cause or the result of the fibrous bands is debatable. The pathological picture, the clinical history, and the physical findings are identical with those of aberrant vessel obstruction. Even the pyelographic studies may be the same.

The treatment of this condition is primarily to overcome the obstruction, and operation should be performed before the renal parenchyma is destroyed. In early cases the proper procedure is simply to remove the obstructing fibrous bands. Usually this can be accomplished very readily. In a large hydronephrosis a portion of the renal pelvis may be removed. It must be appreciated that more than one obstructive lesion of the ureter may be present, and the proper procedure in each case is to be carried out. For example, there may be a constriction at the uretero-pelvic junction and one or more aberrant vessels crossing the ureter (Fig. 4).

3. *Ureteral stricture.*—This pathological lesion is one of the most common causes of ureteral obstruction. Campbell[2] in a large series found that 50 per cent of the cases of ureteral blockage were due to strictures. He reported 101 such lesions in 1936. The stricture may occur anywhere along the course of the ureter, but the most common sites are at or near the uretero-pelvic junction and near the ureteral orifice. Bilateral strictures may also occur; Campbell found 23 such bilateral lesions in his 101 reported cases. In our experience ureteral strictures have always been associated with fibrous bands or adhesions. In several cases the strictures were actually surrounded by this tight fibrous tissue, suggesting very strongly that the lesions were secondary, resulting from long-continued pressure of the fibrous bands. Aberrant vessels have also been associated with ureteral strictures.

The pathological picture that results from a ureteral stricture depends on the site of the obstruction. If the lesion is at or near the uretero-pelvic junction hydronephrosis results. On the other hand, if the narrowing is in the lower ureter, one finds both a hydronephrosis and a hydroureter.

The symptoms of ureteral obstruction are similar to those of obstruction due to bands or aberrant vessels. The principal manifestations are pain, pyrexia, urinary disturbances, with at times chills and fever, nausea and vomiting. Hæmaturia and a mass in the loin may also make their appearance.

The diagnosis of ureteral stricture depends upon all the data that can be obtained in the case. Cystoscopic examination is the most important single examination. If a stricture is quite marked the introduction of a ureteral catheter may be difficult. Further attempts with other types of catheter may be successful, and you then discover a definite hydronephrosis which can be demonstrated by aspirating large quantities of urine from the renal pelvis. Pyelography will demonstrate a dilatation above the obstruction. If the narrowing is high a hydronephrosis only is present; if the lesion is low both a hydronephrosis and a hydroureter can be observed (Fig. 6).

The treatment of ureteral stricture is by operation, which may be either conservative or radical. The conservative method consists of repeated dilatations of the stricture by bougies. In some cases this form of treatment may be sufficient. The majority of ureteral strictures, however, require a more radical procedure. Exploration is carried out, and one of several plastic operations is decided upon. The Fenger operation consists of a longitudinal incision through the stricture, with transverse suture according to the Heinecke-Mikulicz principle for pyloroplasty. This operation has been praised by some and condemned by many. Herbst and Polkey[8] have shown experimentally that following this procedure the ureter buckles at that point. A more popular procedure is the utilization of the Rammstedt technique for pylorospasm. It was first applied to the ureter by Davis,[4] and later by Vose,[11] Bidgood and Roberts.[1] This procedure consists in cutting longitudinally the strictured muscle down to the mucosa in one or more places. Others, like Quinby[10] and Walters,[12] recommend re-implanting the ureter into another portion of the pelvis. It must be remembered that ureteral strictures are usually associated with fibrous bands, and these have to be removed thoroughly before any form of pyeloplasty is carried out.

4. *Nephroptosis.*—Renal ptosis, while not an uncommon finding, is less frequently encountered than any of the above mentioned lesions. The condition is most commonly met with in thin children, and is usually associated with general visceroptosis. The right kidney is more often affected than the left, although both may be ptosed. The condition is more commonly found in females.

In renal ptosis a kink at the uretero-pelvic junction is usually present. This narrowing may be enhanced by a tight band or even an

aberrant vessel. As the hydronephrosis develops more nephroptosis results, with increasing ureteral obstruction. Then the usual vicious circle is formed. If the obstruction is present for a long time infection supervenes and ultimately severe renal damage results. It is obvious that early recognition and treatment of the condition are essential.

Palliative measures may be resorted to. The child is put to bed, flat on the back, for two to three weeks, followed by the wearing of a good abdominal support. If this treatment is unsuccessful then the proper procedure is nephropexy,

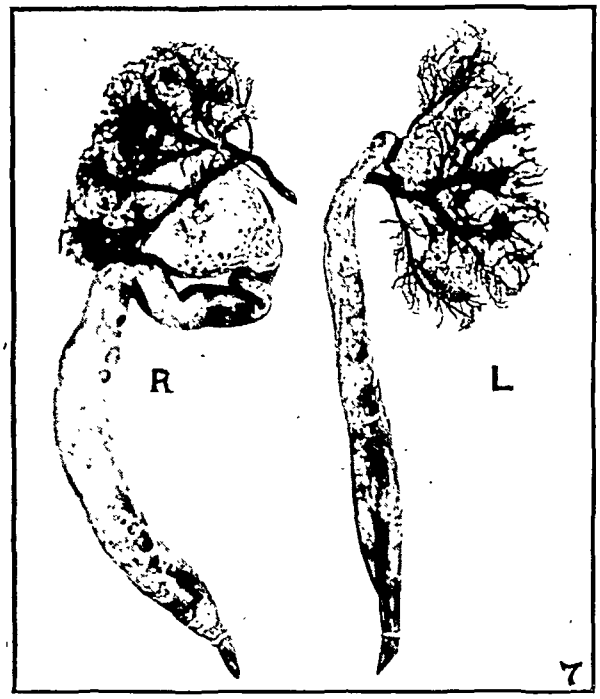


Fig. 7.—Casts of the renal pelves, ureters, and renal circulation. Note the spiral torsion at the uretero-pelvic junction on both sides, more marked on the right. Note also the tortuosity of the right ureter in its upper third. Both ureters are dilated throughout, and each had a stricture near the ureteral orifice.

including the removal of adhesions and the straightening of the ureter. If a large hydronephrosis is present part of the renal pelvis should be removed. After operation the child should be kept flat in bed for at least three weeks.

5. *Ureterocele.*—By ureterocele we mean the cystic dilatation of the lower end of the ureter due to a stricture or narrowing of the ureteral orifice. This lesion must not be confused with the so-called prolapse of the ureter, which is really an eversion of the ureteral mucous membrane into the bladder. It is not common, but several cases have been reported in the literature. Recently Gibson[7] discussed the subject and reported 2 personal cases. Campbell[2] in 1934 mentioned 11 cases. Bilateral cases have also been encountered.

Ureterocele is believed to be the result of an anomalous development of the lower ureter. There are a number of theories regarding its origin. The consensus is, however, that it results from the stenosis of the ureteral orifice caused by the epithelial bar growing downwards to separate the ureter from the primary excretory duct.

There are no symptoms that are characteristic of ureterocele. Clinically the picture is that of urinary obstruction, with or without infection.

A positive diagnosis of ureterocele can only be made by a cystoscopic examination. By this procedure one definitely observes the lesion. A cystogram and pyelogram may also be taken, and usually are of considerable value (Fig. 8).

The treatment is to overcome the obstruction early and to establish adequate drainage. This conservative method consists in repeated ureteral dilatations by means of bougies. Where the ureteral orifice is very small it may be necessary to cut the orifice with either cystoscopic scissors or a fulgurating electrode. In several cases none of these procedures is practical, and one may have to resort to fulguration and even excision of the cystic dilatation. In long-standing cases where the kidney and ureter are badly damaged a nephrectomy and complete ureterectomy is the proper procedure.

6. *Torsion of the ureter.*—Torsion of the ureter is rare and very few cases are reported in the literature. The torsion is usually at the uretero-pelvic junction, and in a number of instances recorded other congenital anomalies were also present in the genito-urinary tract. For example, Woelfler[13] found a case of ureteral torsion associated with congenital valves in the course of the ureter. In our case there was a spiral torsion at the uretero-pelvic junction on both sides, more marked on the right. In addition there was tortuosity of the right ureter in its upper third. Both ureters were dilated throughout, and each had a stricture near the ureteral orifice (Fig. 7).

All writers believe that torsion of the ureter results from the persistence of the rotation of the Wolffian duct during its development (Eisendrath and Rolnick[5]).

7. *Ureteral calculus.*—Calculus in the ureter is of course not a congenital anomaly. However, in the majority of cases it results from urinary stasis caused by a congenital obstructive lesion somewhere in the urinary tract.

Years ago calculous disease in children was commonly encountered. This was particularly true in Asia and several parts of Europe. With improvement of sanitation and dietetics its incidence has greatly diminished. Today in this

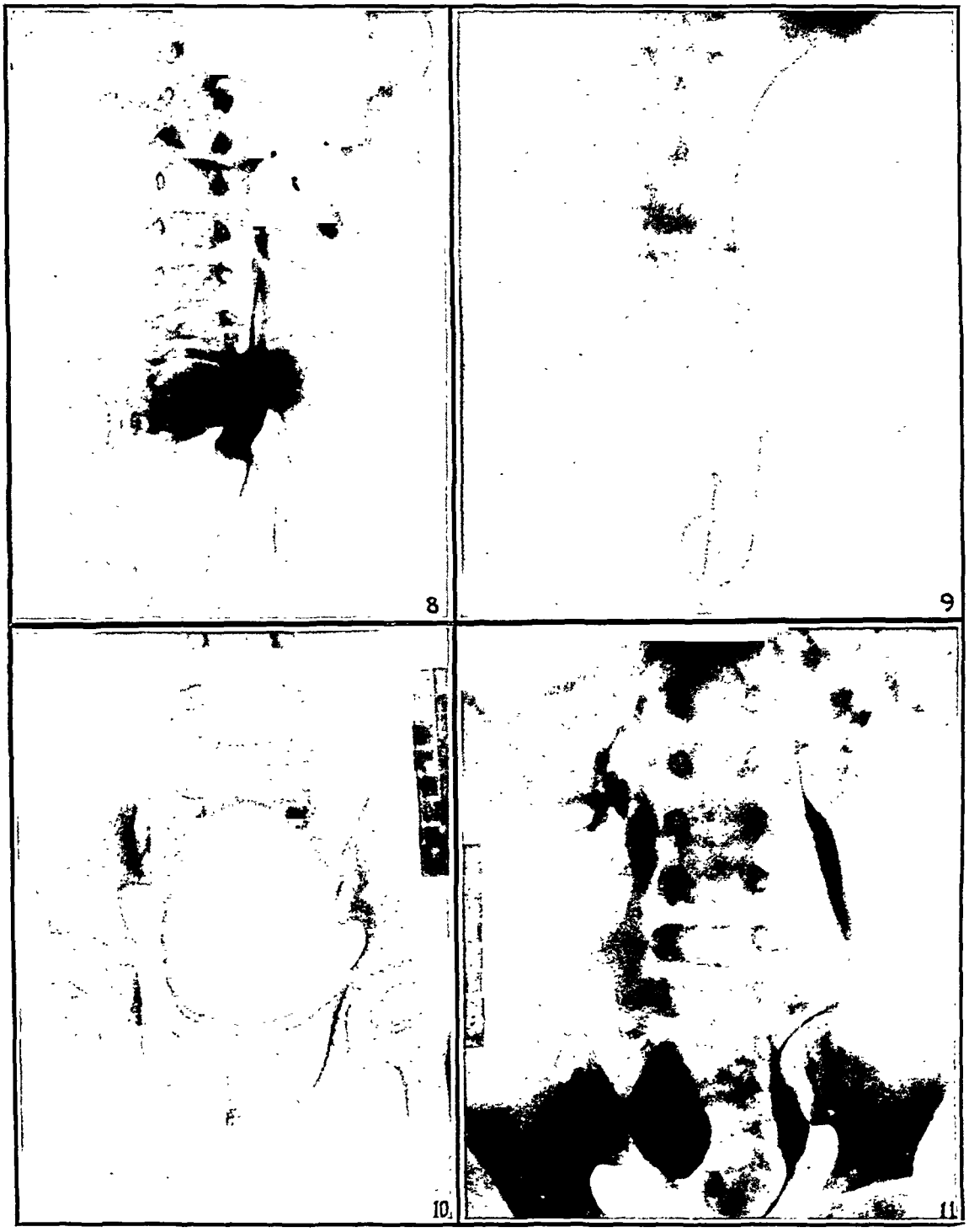


Fig. 8.—A large hydronephrosis and hydroureter. A large ureterocele was observed on cystoscopic examination. Fig. 9.—An elongated calculus in the lower third of the ureter in a female aged 7 years. Fig. 10.—Cystogram in a male child aged 7 years, with a contracted vesical neck. Note the large bladder with many small diverticula. Fig. 11.—Pyelo-ureterogram bilateral in the case just described (Fig. 10). Note the large dilated ureters.

country calculus disease in children is quite rare. Campbell, in a series of 508 children with a urological problem, found 2 ureteral and 6 renal calculi only. This finding has been true in all the clinics in this country.

The clinical history is that of a renal or ureteral colic which very often is associated with nausea, vomiting, or both. The urine nearly always shows gross or microscopic blood. The diagnosis is made on the history, physical examination, urinalysis, and, finally, x-ray examination. Cystoscopy with pyelography should always be performed (Fig. 9). Intravenous urography may also be used and is usually a very valuable asset.

The treatment depends on the site and size of the calculus. If it is high up in the ureter surgical removal is the procedure of choice. If the calculus is small and low, ureteral dilatation will usually suffice. On the other hand, if the stone is low, but large, surgical removal is the proper treatment.

OBSTRUCTIONS OF THE LOWER URINARY TRACT

Let us now turn to the lesions of the lower urinary tract that are responsible for urinary stasis. In this group the obstruction may be found anywhere along the course of the urethra, from the external urethral meatus to and including the vesical neck. For the sake of clarity the lower urinary obstructions may be divided into two groups, namely, those found in the anterior urethra and those in the posterior portion.

The most common obstructive lesions of the anterior urethra are meatal strictures, stenosis of the prepuce, and stricture of the anterior urethra.

These lesions which are met with not infrequently respond to treatment quite readily. A meatotomy and urethral dilatation correct the anterior and urethral strictures. For the stenosis of the prepuce a dorsal slit or circumcision may be performed.

Obstructive lesions of the posterior urethra and vesical neck.—These conditions are not uncommon and give clinical pictures which simulate those observed in men suffering with prostatic obstruction. The children usually complain of frequency, urgency, difficulty in urination, small stream, and hesitancy. At times there is dysuria and even hæmaturia. Several of these children have incontinence, and a diagnosis of functional enuresis is frequently made. In advanced cases there are residual urine, infection, and signs of renal insufficiency. If the obstruction is not removed uræmia eventually sets in, with death ensuing shortly after.

The bladder may show trabeculations and even diverticula. The ureters are dilated and bilateral hydronephrosis is present. In late cases the kidneys are destroyed, and now the picture is that of a bilateral pyonephrosis and pyoureter. The urine nearly always contains a great deal of pus, many bacteria, and microscopic blood. If residual urine is present its reaction is strongly alkaline.

The most common obstructions of the posterior urethra and vesical neck are contracted vesical neck, posterior urethral valves, cysts and hypertrophy of the verumontanum.

Contracted vesical neck.—This type of obstruction has been recognized for a long time. It is due either to a muscular hypertrophy or a fibrosis of the vesical neck. Occasionally this lesion is associated with obstructing folds of mucous membrane. Urinary difficulty from birth should make one consider the possibility of a contracted vesical neck, and the proper urological investigation should be carried out. The importance of early recognition is obvious. In the routine examination of the genito-urinary system it may be found that a soft rubber catheter, even a French No. 8, will meet obstruction at the vesical neck. It may be necessary to use a filiform to overcome this. Large quantities of infected residual urine, which is usually alkaline, may be withdrawn.

A cystogram will reveal trabeculations and diverticula (Fig. 10), and very often there is evidence of reflux up one or both ureters, which are usually markedly dilated (Fig. 11). The obstruction may be removed either by repeated dilatations with sounds or by resection. At times both methods are used.

Valves of the posterior urethra.—Posterior urethral valves are quite common, and the lesion should be considered in all cases of urinary difficulties in male children. Young,[15] in 1912, observed the first case cystoscopically and removed the obstruction by operation. Several cases have been reported since. In 1934 Lowsley and Kirwin[9] reported 133 cases. In 1937 Fagerstrom[6] collected 10 additional cases and added 4 of his own, making a total of 147.

We have observed one case at the Children's Memorial Hospital.

The valves vary in size and shape. They may consist of simple mucosal folds or ridges or they may take the shape and form of definite fibrous diaphragms. Young and McKay[14] report three distinct types.

The diagnosis of urethral valves can be made by cysto-urethroscopy. At the same time the bladder will show trabeculations, diverticula, and marked inflammation. Pyelography, whether retrograde or intravenous, will usually reveal large dilated ureters and renal pelves.

When treatment of these children is considered, the same principles that are applied to men suffering with chronic urinary retention must be observed. The bladder must be emptied gradually and drainage continued until the renal function improves. This may usually be done by an indwelling soft rubber catheter, although occasionally a suprapubic drainage may be necessary. The patient must be given large quantities of fluids, and other forms of elimination are to be carried out. When the general condition of these children improves, as evidenced by better kidney function, cleaner urine, improved appetite, and gain of weight, the question of surgical interference may be considered. The object of the treatment is the removal of the obstructing valve. In the majority of cases fulguration of the obstruction through the operating cystoscope is the ideal method of approach. In rare instances, where urethral instruments cannot be passed, the valves may be removed through a suprapubic cystotomy. Some surgeons advocate urethral dilatation only. In our case fulguration through the operating cystoscope was successfully carried out.

Cyst of the posterior urethra.—This condition must be very rare. Campbell does not mention the condition in his papers. Eisendrath and Rolnick just refer to the congenital valves and hypertrophy of the verumontanum in children. Our reason for mentioning the lesion is that we have encountered such a case. The diagnosis was made at autopsy. The clinical history and findings were those of a posterior urethral obstruction with severe renal destruction, insufficiency and infection. Dr. Chase,[3] of the Department of Pathology, Royal Victoria Hospital, has made a thorough study of the case, and believes that the cyst resulted from a congenital stenosis of Cowper's duct.

Hypertrophy of the verumontanum. — This lesion is less common than urethral valves. The condition is very often undiagnosed, and several cases have been observed at autopsy. Cases have been discovered in stillborn children, and were associated with bilateral hydronephrosis and hydroureter, and destroyed bladders.

Summary and Conclusions

1. Obstructive lesions of the urinary tract in children are usually congenital, resulting from anomalous development.

2. Obstructions in children are found both in the upper and lower urinary tracts.

3. All children with pyuria should have a thorough urological examination.

4. The importance of early recognition and treatment of urinary obstruction is stressed.

5. Treatment of urinary obstruction must be instituted before advanced destructive damage to the genito-urinary tract has taken place.

6. The most common obstructive lesions of the urinary tract in children are discussed.

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UNUSUAL MALIGNANT CONDITIONS OF THE SKIN*

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THE following cases were chosen primarily to present lesions of large size which might occasion difficulty in determining the method of treatment. While all were treated by irradiation only, no attempt is made to undervalue other methods of treatment which may give equally good results, but it is thought well to emphasize that the progress made in each case was eminently satisfactory.

CASE 1

Wm.K., aged 83, with a malignant lesion involving the right lower lip.

History and examination.—It began 25 years before as a small fissure, healing at intervals for a few weeks at a time only. On presentation for treatment there appeared on the right lower lip a heavily infiltrated ulcer the size of a shelled almond, the whole lesion being about the size of an almond nut. There was one large submaxillary gland, freely movable, which had been present for years. *Biopsy report.*—Squamous cell carcinoma (Broders, Grade I).

Treatment.—Combined radon and deep x-ray therapy. Eight 1 millicurie gold radon seeds were inserted into the growth, making a total of 8 millicuries; deep x-ray therapy to both sides of neck—with 1 mm. each of aluminum and copper at 50 cm., distance 200 KV and 20 MA for 16 minutes. Four hundred R-units were given to each side of the neck over a period of ten days, making a total of 1,200 R-units to each side of the neck.

CASE 2

Mrs. T., aged 70, with a malignant lesion of the left cheek below and in front of the external auditory meatus.

History and examination.—This began two years before as a small hard lump without any head. It did not break down until a few months before the patient presented herself, and she had only sought medical advice recently. On examination there was a raised discharging area with crusts, in all, the size of half a walnut, on the left side of the face in front of and below the external auditory canal. *Biopsy report.*—Fibro-sarcoma.

Treatment.—Radium, x-ray and radon. Following the application of boracic compresses for 24 hours a plaque of radium was applied with 1 mm. platinum filtration and 4-ply rubber for 720 mg. hours. When seen six months later the primary lesion was healed, but there was present in the upper corner and bulging in the canal of the left ear a hard mass about the size of a small olive. Deep x-ray therapy was applied, using 200 KV with 20 MA at 50 cm. distance, filtered through 1 mm. of aluminum and 2 mm. of copper, for 14 minutes, giving 210 R-units at each exposure. These treatments were given over a period of 24 days for a total of 2,940 R-units.

When seen two months later deafness was about complete in left ear. Two months later some swelling and induration were present in front of left ear, quite tender, with bulging into the anterior wall of the canal as a hard firm adherent mass, in all about the size of an almond nut. Five 1 millicurie radon seeds were inserted, 2 in the meatus and 3 outside beneath the growth, and 4 additional x-ray treatments as above given in the area, totalling 840 R-units over 4 days.

CASE 3

Wm.F., aged 70, with a malignant lesion involving the right side of the head.

History and examination.—The primary condition began 20 years before the patient presented himself for treatment, as a small pimple on the right temple irritated at times by scratching with a pencil. About 2 years before the lesion had become crusted and broken down. On presentation for treatment there was a large area on the right side of the head, about 4 x 5 inches, with spreading margins crusted and scaly and a tendency to spontaneous healing in centre. *Biopsy report.*—Basal cell carcinoma.

Treatment.—This consisted of superficial x-ray, using 130 KV with 5 MA at a distance of 14 inches through 4 mm. of aluminum for 10 minutes. Six of these treatments were given over a period of seven weeks, in all, 1,440 R-units. Two months later the lesion appeared to be completely healed and replaced with soft pliable scar, but when seen a month later a few minute lesions had reappeared. Six more similar treatments were given over a period of 10 weeks of 1,440 additional R-units, making a total of 2,880 R-units during a period of 7 months.

CASE 4

J.B., aged 63, with a large warty growth involving the whole lower lip.

History and examination.—The patient stated that the condition began two years before as a small whitish spot on the inside of the lower lip. It had been treated by a local physician with white salve one and one-half years before. On presentation there was a large warty fungating growth, which began on the right side of the lower lip, spreading rapidly the previous four months and now involving the whole lower lip. *Biopsy report.*—Squamous cell carcinoma (Grade I, Broders).

Treatment.—Combined radon and x-ray. Gold radon seeds, to the amount of 15.96 millicuries, were inserted throughout the growth. Using the deep x-ray therapy machine, the following treatments were given, with 200 KV 20 MA at 50 cm. distance through 1 mm. aluminum and 2 mm. copper; exposure time 20 minutes. These treatments were given to the lip and cervical regions, alternating between the right and left side over a period of 7 days—a total of 1,800 R-units. Reducing the time factor from 20 minutes to 14 minutes, 8 additional treatments were similarly given over the next 9 days, with a total of 1,680 R-units. This amounted to a sum total of 3,480 R-units, given over a period of 16 days.

When seen in May, 1937, six months after the beginning of treatment, there appeared to be perfect healing of lip with a gain in weight by patient of 25 lbs.

CASE 5

J.M., aged 65, with an extensive ulcerated mass involving the whole chin.

History and examination.—The patient appeared first for treatment in May, 1930, with a history of onset

* A paper read at the Sixty-eighth Annual Meeting of the Canadian Medical Association, Section of Dermatology, at Ottawa, June 24, 1937.

a few years earlier. On examination there was a nodular, bleeding, necrotic, foul-smelling area with rolled borders, nearly one inch deep, involving practically the whole chin.

Treatment.—May, 1930, applied 165 mg. of radium in 8 capsules over a heavy dressing for 10 hours, a total of 1,650 mg. hours.

July, 1930, two months later there was very little change. A similar application of radium, 165 mg., was applied for 12 hours, a total of 1,980 mg. hours.

When seen one month later, in August, 1930, there was marked improvement, with the growth receding to about one-half of its original size. A similar application of radium was made, totalling 2,400 mg. hours. Seen four months later, in January, 1931, the condition was almost healed, when an additional application of screened radium was applied, 175 mg. for 12 hours, totalling 2,100 mg. hours. When seen in April, 1931, eleven months after the beginning of treatment, the growth was completely healed.

Case 6

I.E., aged 74, with a pigmented area on the right cheek.



History and examination.—About 7 years before the patient presented himself for treatment a pigmented area appeared on the right cheek, and seven months before he presented himself a pimple-like projection formed on the upper nasal side, and one month before presentation this projecting area began bleeding. On examination there was a pigmented flat soft area, very dark, in all about the size of a 50c. piece. At the inner and upper border there was a raised area about the size of a pea which showed evidence of recent bleeding. *Biopsy report.*—Melanotic sarcoma.

Treatment.—A surface plaque of radium was applied in September, 1935, with 1 mm. of platinum filtration and 4-ply rubber for 1,200 mg. hours. Seen three weeks later there was a heavy reaction; the lesion appeared to be perfectly healed when examined a month later. Up to the present no evidence of secondaries is apparent.

CASE 7

A.J., aged 57, with a malignant lesion on the left side of the face.

History and examination.—The beginning of the lesion dated back to 1929. The patient had consulted many physicians, undergoing previous treatment by five. Examination revealed a large, open, undermined foul smelling lesion, about 2½ inches in diameter, with a raised border just anterior to the left ear.

Treatment.—X-ray, with superficial x-ray machine, using 4 mm. of aluminum at 12 inches distance, with 130 KV and 5 MA for 20 minutes. Four treatments were given over a period of 7 days, a total of about 1,900 R-units. Seen three months later, the lesion was reduced to the diameter of one inch, and healing. When seen in another three months it was completely healed.

CASE 8

Alex.B., aged 45, with a large elevated tumour to the right of the centre of the back, giving the appearance of a fibroma.

History and examination.—The growth began about 7 years before patient first presented himself, as a small hard lump, seeming to disappear at first under application of iodine, only to reappear again, with recent marked enlargement. On examination there was a large, firm, elevated, hard, finely vascular mottled pinkish tumour about four by seven inches. *Biopsy report.*—Epithelioma adenoides cysticum.

Treatment.—Superficial x-ray, using 130 KV, with 5 MA at 12 inches distance, through 3 mm. aluminum, for 8 minutes. Six exposures were administered, spread over 10 weeks, amounting to approximately 7 erythema doses.

Two years afterwards the growth was completely gone, and the skin normal. The seat of the growth could scarcely be made out.

I take this opportunity to thank Dr. R. K. Paterson, Director of the Tumour Clinic, Ottawa Civic Hospital, for so generously supplying records and photographs.

THE PRESENT STATUS OF INTRAVENOUS ADMINISTRATION OF PENTOTHAL SODIUM IN INSTITUTIONAL AND PRIVATE PRACTICE*

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INTRAVENOUS anæsthesia[1, 2, 3] was introduced in France in 1872, and since then so many promising agents proved ineffective, dangerous, or both that the method fell into disrepute. A revival of interest occurred on the introduction of some of the first of the soluble barbiturates, such as phenobarbital sodium, dial, sodium amytal, pentobarbital sodium and many others. Thousands of successful anæsthesias were reported, but it soon became apparent that the action of these barbiturates was too long and that they therefore were not good anæsthetic agents. The prolonged post-operative sleep which resulted was not only undesirable in itself but tended toward the production of pulmonary and other complications. In many instances varying degrees of excitation attended the awakening from this prolonged sleep, occasionally necessitating restraint. Obviously, such sequelæ were very undesirable and resulted in a rapid decrease in the use of the longer-acting barbiturates as anæsthetic agents.

During recent years two new soluble[4] barbiturates have been introduced, namely, evipal soluble (sodium n-methylcyclohexenyl methyl malonyl urea), which was introduced in Germany as "evipan", and pentothal sodium[5, 6, 7] (sodium ethyl 1-methyl butyl thiobarbituric acid). Both of these agents have a short action, recovery of consciousness occurs rapidly after their administration, and they cause few of the undesirable after-effects produced by their predecessors. The clinical application of these agents bore out the results obtained experimentally, and the earlier results have been confirmed by a long series of cases in which these agents have been used successfully. In action, pentothal sodium and evipal soluble are very similar. Pentothal sodium has been estimated to be between 30 to 50 per cent more potent than evipal soluble, but there is apparently no corresponding increase in toxicity. This agent therefore produces better anæsthesia for a wider range of surgical procedures than does evipal soluble. The recovery from the effects of pentothal sodium is also attended by fewer instances

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of post-operative excitement and muscular phenomena. Therefore, the object of this paper will be an attempt to elucidate the present conception of anæsthesia produced by the intravenous administration of pentothal sodium and to draw particular attention to the scope of this agent as a surgical anæsthetic, the indications and contraindications for its use and the variations in its use in the hospital and in general practice.

Pentothal sodium[8, 9, 10] was introduced clinically in June, 1934, by Lundy, and the results to date are based on its administration in more than 7,000 cases. It is supplied in ampoules containing 1 g. (15 grains) of the drug in the form of a finely divided yellowish powder which is readily soluble in water. Its chemical formula resembles that of pentobarbital sodium except that it contains a sulphur atom. The solution for injection is made with triple distilled chemically pure water; 1 g. of the drug is dissolved in 20 c.c. of the water, to make a 5 per cent solution.

METHOD OF ADMINISTRATION

Some years ago Lundy introduced the intermittent method of injecting barbiturates intravenously. This cast a different aspect on the flexibility and safety of anæsthesia produced by intravenous injection. This holds true not only for the newer short-acting barbiturates but also for the older and long-acting ones. Obviously, the method of injecting a single anæsthetic dose that was calculated from the patient's weight, age and physical condition was highly erroneous. It is a well-known fact that two patients of similar weight, age and physical condition may have entirely different tolerances for any given barbiturate. A dose which may be barely adequate for a certain patient may easily be an overdose for another. Lundy's method consists in maintaining the needle in the vein; following administration of the initial dose subsequent small doses may be instantly administered as the anæsthesia becomes lighter. When this method is used and when the signs of anæsthesia are observed carefully the anæsthesia is not likely to become dangerously deep. Pentothal sodium is thought to be detoxified rather rapidly by the liver. The fact that a patient begins to react and the anæsthesia become lighter soon after the injection of a moderately sized dose means that the drug has already been partially detoxified and that its anæsthetic action has been spent. If the subsequent dose is not administered until this time there is little danger of cumulative effect and overdosage as the previous dose will have been almost detoxified. This principle holds throughout the course of subsequent injections, and the patient may be maintained in the the same plane of surgical anæsthesia for a considerable time. The details of the method will be considered later.

PREMEDICATION

For operations which are expected to be of short duration all premedication may be withheld. Such procedures as the opening of abscesses and extraction of teeth are examples. When no premedication is used recovery of consciousness is much quicker than it is otherwise, and the patient often is awake as soon as the operation is completed. When a rather prolonged anæsthesia is necessary premedication is desirable, as a lesser amount of the anæsthetic agent will be required. For the patient of average weight and physical condition 1½ to 3 grains (0.097 to 0.2 g.) of pentobarbital sodium (nembutal) are administered orally three-quarters of an hour to one hour before the operation. A half hour before operation 1/6 grain (0.01 g.) of morphine sulphate and 1/150 grain (0.0004 g.) of atropine sulphate are administered by hypodermic injection. The dose of pentobarbital sodium or morphine may be decreased or completely withheld if the condition of the patient warrants it. I believe that in the average case there is no contraindication to the oral administration of one barbiturate previous to the administration of another by vein. While it is true that both the morphine and the pentobarbital sodium will permit the anæsthetist to use a much smaller dose of pentothal sodium than otherwise would be required, the method just described permits the anæsthetist to administer only the dose necessary to produce the desired plane of anæsthesia and he need not worry about a cumulative effect.

PREPARATION OF THE PATIENT

A vein in the cubital fossa or on the back of the hand usually is selected. The arm is supported by a well-padded arm board in a comfortable position, and it may be held in place by a strip of adhesive tape. The veins in the foot and ankle are also a convenient site of injection and may be preferable to the veins of

the arms when the operative procedure involves the thorax. One should choose the extremity which will take the anæsthetist as far as possible from the operative field and out of the way of the surgeon and his assistants. Care should be taken to see that the extremity is not constricted above the site of injection, as this will delay the anæsthesia, and when the constriction is removed an overdose will be released into the circulation. When the patient is lying on his side it is better not to use the arm he is lying on for the injection as the circulation may be poor in this arm.

The site of injection having been decided on, the part is prepared with 70 per cent alcohol, tincture of metaphen, or merthiolate 1:1,000, and the extremity is draped under the usual aseptic precautions. When the veins stand out well, manual compression will be sufficient as a tourniquet; otherwise, a tourniquet may be required. When the veins are very small[11] or apparently absent it may be necessary to wrap the extremities, from above the elbows to the finger tips and from above the knees to the toes, in hot moist Turkish towels covered with oiled silk for half an hour before the operation. This will usually render the veins palpable, but warm alcohol should be used for sterilization, as cold alcohol will again cause them to disappear. Attention to such details will often prevent what otherwise might be a failure.

A 20 c.c. glass syringe of the Luer type is suitable. The outlet should be offset to facilitate venipuncture. The 5 per cent solution of pentothal sodium may be made up previously and the syringe and needle may be wrapped in a sterile towel and kept ready for immediate use. If several patients are to be anæsthetized in one morning several solutions may be made up. I do not hesitate to use a solution which has been made up for six or seven hours, provided it is not cloudy or discoloured. There is no evidence of decomposition up to this length of time or for several hours afterward, which shows that the solution is relatively stable. I do not see the necessity for any more complicated apparatus than a syringe and needle. Various complicated syringes which have attachments for administering saline infusion and which may be fastened to the extremity have been devised. The syringe and needle may be held in place for as long as three hours without any great inconvenience to the anæsthetist. With one hand the needle and syringe may be held in place leaving the other hand free for making the injection and palpating the pulse. If the patient moves his arm at any time it is much easier to maintain the needle in the vein if it is held manually. In addition to this the presence of the anæsthetist's hand on the patient's arm readily informs the anæsthetist of increasing muscle tone and beginning movements.

The question of the necessity for someone at the patient's head is frequently raised. For short operations which result in little loss of tone, this is unnecessary; for longer operations, it is essential. Any competent nurse can support the jaw, look after the maintenance of the airway, and check the blood pressure. For all lengthy operations in which this method is used the patients should be in hospital; here it is not difficult to obtain a nurse to sit at the patient's head and attend to the above details.

DOSAGE

Following venipuncture, an injection of 2 to 3 c.c. of the solution is made and the patient is instructed to begin counting slowly. The average adult patient will probably count to fifteen. While a rapidly injected initial dose will cause the patient to cease counting at between seven and ten, this is not as desirable as a slower injection. Having the patient count not only indicates when he is asleep but gives an idea of his tolerance to the drug. A patient who counts up to thirty or forty will likely have a high tolerance and will therefore require more of the drug than will one who counts only to ten. Lundy's[12] method of placing an absorbent cotton or tissue paper "butterfly" over the nose and mouth of the patient immediately following the induction of anæsthesia is an important step toward facilitating the observance of the presence and degree of the respirations. The barbiturates are all respiratory depressants and the degree of depression is a valuable guide to the depth of anæsthesia: As anæsthesia deepens the respirations become progressively more shallow, and, conversely, as anæsthesia becomes lighter the respirations deepen. Should an excessive dose be given respiratory arrest will likely occur. No single injection should be of sufficient size

to depress or arrest the respirations markedly. If one strictly adheres to this rule there is slight danger of getting into difficulty. By watching the movements of the "butterfly" one is not likely to go wrong as to the condition of respiratory function. Should the surgeon be operating about the head the excursions of the abdomen can be used as an indication of respirations if the respiratory passages are patent. The indication for an additional dose may be ascertained in one of two ways. As the respirations become markedly deeper it is a positive sign that the anæsthesia is becoming light. From 0.5 to 1 c.c. of solution injected at this time will bring the average patient back to the previous plane of narcosis. The second method, which is more suitable for the less experienced anæsthetist, is to wait until the first slight sign of increasing muscle tone, movement of an extremity, or slight moaning occurs, and then to inject the next dose, which will require to be slightly increased, probably from 1 to 1.5 c.c. With experience one learns to estimate accurately the tolerance of the individual patient and can adjust the dose accordingly. The analogy to the administration of ether by the drop method is very applicable here. The longer the duration of the anæsthesia, the smaller the subsequent doses will become. In the main, aged, debilitated and very sick patients require the minimal dose of the drug to produce satisfactory anæsthesia; robust, muscular, healthy young adults require the maximal dose. The maintenance of an adequate airway is of the greatest importance. For procedures in which very little relaxation is necessary the breathing is usually unobstructed as in natural sleep. In those in which the anæsthesia is somewhat deeper support of the jaw will usually suffice. Occasionally, it is necessary to insert an artificial airway, particularly in the case of elderly patients without teeth.

The induction of anæsthesia with pentothal sodium is practically devoid of excitement. An interval of from 30 to 45 seconds should elapse before the operation is begun, for the maximal effect of the drug to take place. The maintenance of the anæsthesia can be made smooth if this technique is used. Should the anæsthesia even become so light that the patient cries out, one may be assured that he is not conscious of pain, because of the period of amnesia which occurs during awakening. The signs denoting surgical anæsthesia, other than those referable to respiratory function, are not too reliable. The pupils may be contracted or moderately dilated. The lid reflex, while usually absent, may show some reaction. While relaxation of the jaw is a rather reliable guide to surgical anæsthesia, many cases have been observed in which it was accompanied by little or no relaxation of these muscles. Therefore, I believe that the most reliable sign of the state of anæsthesia is obtained from close observance of the respirations. The pulse rate may be slightly increased. The systolic blood pressure may drop on an average of from 10 to 20 mm. of mercury in a case in which the blood pressure is normal, but it quickly returns to the previous level. In those cases in which there is persistent essential hypertension a drop in blood pressure of from 30 to 70 mm. of mercury may take place. This phenomenon is taken advantage of in the pentothal sodium test for essential hypertension.[13] The drop in blood pressure which occurs under pentothal sodium anæsthesia is equivalent to the drop which may be anticipated following a sympathectomy. In cases in which an adequate drop in blood pressure has been obtained by this test operation may be performed with reasonable assurance of a good result.

The 5 per cent solution of pentothal sodium does not appear to increase or decrease the coagulation time of the blood or the tendency to hæmolysis. Clotting within the needle occurs but rarely, even following long intervals of injection. This can be entirely circumvented if the needle is occasionally cleared by minute injections. The solution in this concentration is only slightly irritating to the tissues should extravenous injection occur. If this happens it is well to massage the region thoroughly with an alcohol sponge, and should a large amount have been injected hot moist compresses should be applied to the region following the patient's return from the operating room. Venous thrombosis at the site of injection has occurred in only a very few cases.

ANALEPTICS

Theoretically, a respiratory stimulant is the logical antidote for the barbiturates. Lundy suggested adding coramine (a 25 per cent solu-

tion of pyridine betacarbonic acid diethylamide) to the solution of pentothal sodium, in the hope that the coramine would partially combat the respiratory depression and render respiratory movements more visible. Each c.c. of the combined solution contained approximately 50 mg. of pentothal sodium and approximately 12.5 mg. of pyridine betacarbonic acid diethylamide. Although the amount of respiratory stimulant was small it was felt that it might stimulate respiration slightly without producing an antagonistic effect and lighten the depth of anæsthesia. In about 2,000 of the total number of cases in which pentothal sodium has been used at the Mayo Clinic the combined pentothal-coramine solution has been employed. Up to the present time it has been difficult to formulate our results but it has been thought that in light anæsthesia there was some respiratory stimulation, especially if premedication with morphine and pentobarbital had been employed. Animal experiments corroborated what we noted clinically, but it was further proved by experiments with animals that if an overdose of pentothal sodium was administered and respirations were stopped the stimulating effect of the so-called stimulant was variable. Assuming that an overdose of barbiturate is "locked" in the lipoids of nerve tissue, it is not hard to assume that even large doses of an analeptic would under these conditions have no effect. This bears out the reason for our strict attention to respiratory function. We believe that the use of an analeptic in the anæsthetic solution may have still further possibilities and we hope to report further on this question.

Postanæsthetic Phenomena

Recovery from pentothal sodium anæsthesia occurs as it does from natural sleep. Nausea and vomiting are practically absent and many patients have eaten their regular meal a short time after an anæsthesia for some minor procedure. Following operations of short duration the patient is awake and responsive before he leaves the operating room. It has been in only a few rare cases, and following the administration of large doses, that sleep has lasted longer than twenty to thirty minutes. Excitement and muscular phenomena, such as twitching, which are noted after the use of some other barbiturates, are essentially absent, although some nervous patients may cry and be somewhat disturbed for a short time. Following the administration of large doses patients will be unsteady and "groggy" for one to two hours, but following initial recovery they usually fall asleep and awake refreshed. No remote complications or effects have been noted at the Clinic.

The total dose used for any given procedure varies a great deal in different patients. At the Clinic we have in the past advised a total maximal dose of 1 g. of pentothal (20 c.c. of a 5 per cent solution) but recently have felt that this can be safely increased up to 1.5 g. or more if the described method of injection is strictly followed. We have administered as much as 3 g. to a patient and have seen no ill effects. Operations under this type of anæsthesia have occasionally lasted as long as three and a half hours.

Indications and Contraindications

From the results we have obtained I feel that our enthusiasm for this method of anæsthesia is justifiable. This is in part due to the method of administration, to the recognition of the contraindications, and to a refusal to use the method for surgical procedures beyond its useful scope. The method, while admirable in many types of cases, is absolutely unsuitable and inadequate in others, and if one uses it thoughtlessly in unsuitable cases one both endangers the patient and complicates the operation. The variety of surgical procedures for which it may be the best anæsthesia is large; other valuable methods are available in cases in which it is not applicable. One cannot stress too strongly the following contraindications.

Pentothal sodium should not be administered to children who are less than eight to ten years of age, as it is a respiratory depressant and the trachea and bronchi of such children are small. In certain cases it may be given to a child of seven or eight years of age for some minor procedure, provided minute doses and cautious administration are used. People of extreme age tolerate the drug well, provided the cardiac and respiratory systems are in rather good condition. It is not contraindicated for debilitated and very sick patients, but much greater caution must be used in the administration, and the effective dose will be much smaller than that given to healthy patients. Because of the depressant effect on respiration the drug is

definitely contraindicated in the presence of pulmonary disease that reduces pulmonary ventilation. Likewise, any marked degree of cardiac insufficiency contraindicates its use. Moderate renal involvement does not constitute a contraindication. However, when the kidneys are markedly involved it is preferable to use another form of anæsthesia as the disintegration products of the drug are thought to be excreted by the renal system. Theoretically, the drug should not be used in the presence of hepatic insufficiency, as it is believed that the drug is detoxified in the liver. I have not been aware of any marked cumulative effect in cases in which the hepatic function has been subnormal. I do think it advisable as yet, however, to withhold its use when there definitely is marked hepatic disease. There are a few patients, especially young muscular adults, who appear to be particularly resistant to the drug; after the administration of 0.5 to 0.75 g. of the drug anæsthesia is insufficient to permit incision of the skin. In the few cases in which this may be noted it is preferable to discontinue the injection and use another method. The drug is not suitable for certain types of operations. In safe doses it will not obliterate the pharyngeal and laryngeal reflexes, and therefore it is unsuitable and dangerous for operations about the throat, such as tonsillectomy. It is also dangerous for operations about the nasal and oral passages when any amount of blood or infected secretion is present. Doses within the limits of safety will not obliterate the abdominal and peritoneal reflexes; therefore the drug may not be safely used as the only anæsthetic for intra-abdominal operations. When this method of anæsthesia is used it is rarely possible to pass a Magill intratracheal tube through the glottis, but the chances of intubation are greatly facilitated if the throat has been sprayed with a local anæsthetic, such as a 10 per cent solution of cocaine or a 5 per cent solution of butyn. If such a condition should arise and the throat has not been sprayed it will be preferable to spray it before intubation. Pentothal sodium should not be administered intravenously where the facilities for administering oxygen and carbon dioxide are not readily available. Airways and other necessary equipment should also be at hand. The instances in which it may be used in the doctor's office will be considered subsequently.

From the standpoint of the patient the method could hardly be more satisfactory. Both the induction and the recovery are usually unnoticed by the patient, and he hardly realizes that he has had an anæsthetic. The freedom from nausea and vomiting is much appreciated. The surgeons appreciate the time saved during induction and the fact that the anæsthesia produces little or no after effects.

Pentothal sodium can be used to supplement any other type of anæsthesia without producing any untoward effect and with decided advantage in certain cases. For the patient who dreads induction by inhalation methods, an initial dose of pentothal may be given and the inhalation started as soon as he is asleep. When a patient has some facial defect which makes a tight fit of the mask difficult anæsthesia may be induced with pentothal sodium and maintained with ether administered by the drop method. There also are many possibilities for the combination of local and regional procedures with intravenous anæsthesia. It is possible to perform abdominal operations provided a thorough block of the abdominal wall has been done before the administration of the intravenous anæsthetic.

THE PRACTICAL SCOPE OF THE METHOD

Table I shows the increase in the use of pentothal sodium at the Clinic from 1934 to 1936 inclusive. This shows that pentothal sodium was used in 4,119 cases up to the end of December, 1936. At the time this paper was written it had been used in more than 7,000 cases. The

TABLE I.
INTRAVENOUS ANÆSTHESIA WITH PENTOTHAL SODIUM

	1936	*1935*	*1934*
Operations on brain, spinal cord, and peripheral nerves	177	76	3
Operations on eye	89	52	20
Operations on head and neck (other than above)	339	276	9
Dental extractions	22	32	2
Transurethral and cystoscopic operations and manipulations	834	458	25
Orthopædic operations	137	44	1
Operations on thorax, thoracic wall, breast, and axilla	291	158	1
Intra-abdominal operations	139	57	7
Operations on abdominal wall and for hernia	50	23	
Gynæcological operations	578	147	4
Operations on anus	57	10	1
Total	2,713	1,333	73

drug has been used for the following operative procedures.

Operations on the brain, spinal cord and peripheral nerves. — These included extensive procedures such as craniotomy for abscess of the brain, trephination of the skull, elevation of depressed fractures, encephalography, avulsion and suture of nerves and many other types of operation. In many cases the anæsthesia has been maintained for as long as two and a half to three hours. In addition it has been employed for such external procedures about the skull as the suturing of lacerations of the scalp. In many of these cases the electrocautery is used and the use of pentothal sodium does away with any danger of fire and explosion. This is also true in other operations in which the cautery is employed.

Operations about the eye.—These operations have been a particularly practical field for the use of the drug. Enucleations can be performed successfully, as can operations about the lachrymal apparatus and eyelids. Operations for cataracts in cases in which the patients are nervous can be carried out in a satisfactory manner, the method being particularly valuable in cases in which the conjunctiva is badly congested and instillation of a local anæsthetic may result in inadequate anæsthesia.

Operations about the head and neck.—Most plastic operations about the head and neck, even though of long duration, can be done more advantageously with pentothal sodium than with other methods of anæsthesia. It removes the anæsthetist and his equipment from the operative field and lessens the danger of contamination. Very small amounts of the drug need be used if a little local infiltration is used at the same time. The patient may usually be anæsthetized so lightly that any artificial airway is unnecessary. The method is particularly practical for the electrocoagulation of epitheliomas about the head and neck. Among other procedures one could mention insertion of radium, skin grafting, the cutting of tube and pedicle grafts, and the emergency suture of wounds in this region.

Dental extractions.—Pentothal sodium may be used for difficult extractions of from one to three teeth in cases in which the patients dread local anæsthesia or are sensitive to a local anæsthetic. As the procedure is of short duration the patient is usually awake shortly after the operation is completed.

Transurethral and cystoscopic operations and manipulations.[14]—The method has displaced low spinal and sacral anæsthesia to a great extent in this field. It is well tolerated by elderly patients, and many of the shorter transurethral prostatic resections are done completely under this form of anæsthesia. In some operations which last more than one hour only 1 gm. of the drug will be required. Other procedures in which this method has been used include cystoscopic examination, catheterization of the ureters, manipulation of ureteral and vesical stones, and coagulation of bleeding points in the urethra or bladder. The method also may be used for litholapaxy.

Orthopædic operations.—These are too numerous to mention. Relaxation is adequate for the reduction of fractures and dislocations and other emergency procedures. Other procedures include manipulation of ankylosed joints, ganglionectomy, curettage for osteomyelitis, and so forth.

Operations about the thorax, thoracic wall, breast and axilla.—All surgical procedures on the breast, from biopsy to radical amputation, may be done under intravenous anæsthesia. For radical amputations, however, an inhalation anæsthetic may be preferable. Thoracoplasty and other plastic work on the thoracic wall may also be mentioned.

Intra-abdominal operations.—At the clinic we do not advocate doing abdominal operations under intravenous anæsthesia, but in certain instances it may be justified if the intravenous anæsthesia is combined with a block of the abdominal wall.

One may cite a case in which an elderly male patient had a gastric condition which had been diagnosed as carcinoma. A few days before operation he had a pulmonary infarction and inhalation anæsthesia was considered inadvisable. Due to a low value for the hæmoglobin we did not wish to use spinal anæsthesia, so, following a thorough block of the abdominal wall with 250 c.c. of a 0.5 per cent solution of metycaine which contained epinephrine, the patient was given pentothal sodium intravenously. The exploration revealed an operable carcinoma of the stomach and a subtotal gastrectomy was done. The operation lasted forty-five minutes and 18 c.c. (900 mg.) of the solution of pentothal sodium were administered. Relaxation was adequate for closure, the patient left the operating table in good condition, and three weeks later he was making an excellent recovery.

This case is cited to demonstrate what may be done under certain conditions. Most opera-

tions on the abdominal wall, such as secondary suture of wounds, can also be done under this type of anæsthesia.

Gynæcological operations.—The method has proved most useful for such operations as dilatation and curettage, vaginal hysterectomy, plastic work about the perineum, and, in fact, most of the extra-abdominal gynæcological operations. Perineorrhaphies of one hour's duration are frequently performed.

Operations about the anus.—Pentothal sodium produces sufficient relaxation of the anal sphincter to permit anal dilatation, excision of a fissure, hæmorrhoidectomy, and is well suited for proctological examinations and the fulguration of rectal carcinomas. We employ it in the few cases in which sacral block is contraindicated. Under a very small injection, rectal packs are easily removed.

Miscellaneous procedures.—We have found this method to be of use in painful vaginal examinations, removal of packing after posterior resection of the rectum, closure of colonic stomas, and in certain medical cases in which a prompt but transient effect is desired.

COMMENT

These instances give an idea of the variety of surgical conditions which may be handled under pentothal sodium anæsthesia with satisfaction to the surgeon and the patient.

This series of operations was done in hospitals in which the equipment for meeting any emergency was at hand. I am frequently asked about the possibilities of the drug for office use by the general practitioner. Certainly no operations of any marked duration should ever be performed in the office or the home unless the anæsthetic is administered by a competent anæsthetist who carries emergency equipment such as oxygen and carbon dioxide with him. However, if the general practitioner becomes familiar with the properties of the drug, its method of administration, and its potential dangers, he may safely use it in the office when a light transient anæsthesia is desired, such as would be needed for opening abscesses, and in other minor surgical conditions which do not last more than five minutes. In addition, no physician should attempt to use the method in his office unless he has facilities for allowing the patient to lie down for at least an hour or more following recovery. Even patients who appear absolutely awake and normal when lying down may be both dizzy and unsteady when they get on their feet. If allowed to leave the office too soon or unaccompanied they are very likely to have some serious accident which will cause complications both for the patient and for the doctor from a medico-legal standpoint. In any event, these patients should never be allowed to go home unaccompanied.

Inexperienced persons should learn the properties and use of the drug and see it administered before they attempt its administration themselves. Lastly, the beginner who has performed a few successful operations under this type of anæsthesia and is highly enthusiastic about his results is warned against its use in cases in which it may be contraindicated, inadequate, or both.

SUMMARY

Anæsthesia produced by using a 5 per cent solution of pentothal sodium intravenously is a method which is both safe and useful in a wide field, provided that the drug is correctly administered in suitable cases.

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FETAL RESPIRATION AND ITS RELATION TO ABNORMALITIES OF THE NEWBORN*

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THREE clinical problems involving the respiratory system of the newborn, namely, (1) asphyxia; (2) atelectasis, and (3) pneumonia, may be approached from a new viewpoint if one takes into account certain observations which show that the first respiration is not initiated at birth but takes origin far back in embryonic life. Instead of a state of prolonged apnœa, the fetus shows rhythmical respiratory movements throughout a large part of intrauterine life.[1]

The intrauterine respiratory movements may be observed directly through the thin uterine wall in the rabbit. Experimental conditions essential for direct observation of intrauterine breathing for many hours involve the hormonal inhibition of labour and the elimination of anæsthetics. A typical experiment is recorded in the motion pictures (shown at the meeting). There is included also a photographic record of the respiratory movements of the human fetus which are transmitted through the abdominal wall of the mother.[2]

In view of the respiratory activity of the fetus long before birth it is evident that failure of respiration in the newborn, or asphyxia neonatorum, must be regarded as a suppression of previous activity rather than failure of some new mechanism to begin functioning at birth. In the apnœic newborn child the question is not what causes the first breath but rather what factors have been superimposed to suppress the continuation of respiratory movements. With regard to the causes of intrauterine respiratory failure it may be pointed out that in rabbit fetuses showing regular respiratory movements apnœa may be induced of three different types, namely, (1) anoxæmic; (2) acapnic; (3) anæsthetic. These factors belong to the period preceding delivery. To deal with them at that time by efforts to maintain adequate oxygenation and caution in the choice and use of anæsthetic agents would be more effective than later attempts at resuscitation.

The next question is whether or not amniotic fluid enters the lungs as a result of the respiratory movements. In order to determine the existence of a tidal flow of amniotic fluid in the respiratory tract, India ink was added to the amniotic fluid. Comparison was made of the lungs of fetuses which had been showing respiratory movements with those of litter-mates in which breathing had been suppressed by the injection of pentobarbital sodium. In breathing fetuses the lungs were blackened, while in contrast in apnœic fetuses the lungs were normal. Microscopical examination showed carbon particles in the alveoli of the lungs of the former (even within 1 minute) but not of the latter.[3]

The aspiration of amniotic fluid is not an accidental complication of labour but must be viewed as a normal consequence of fetal respiration. The respiratory movements are responsible for a tidal flow of amniotic fluid into the lungs, which thus affords a mechanism for the dilatation of the future air passages. Fetal respiration thus aids in the structural differentiation of the normal lung.

Regarding atelectasis and pneumonia it is evident that the breathing of abnormal amniotic fluid before birth may give rise to both types of injury. The normal development of the alveoli may be complicated by the presence of amniotic fluid containing débris of excessive amount or abnormal type. A mechanical obstruction of bronchioles brought about during embryonic life may interfere with the normal flow into the lung of amniotic fluid and result in incomplete dilatation of alveoli, *i.e.*, atelectasis. Certain types of débris, such as cells, meconium and sebaceous matter, may be injurious not only as foreign bodies but also as chemical irritants. In view of the rapid exchange of fluid between the pulmonary alveoli and the amniotic sac, bacterial contamination exposes the alveoli to immediate invasion by a current of infected

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fluid. The pathogenesis of intrauterine pneumonia may be clearly reconstructed in many cases as a complication of normal intrauterine respiration.

One further point may be considered. Why is the newborn not drowned if the alveoli are filled with amniotic fluid at the time of birth? A clue is afforded by microscopical examination of the lungs shortly after delivery when the breathing of air has just begun. A striking dilatation of the alveoli is found in contrast to the moderate size of the alveoli before birth. The elasticity of the alveolar walls permits an increase in size of the alveoli of such magnitude that the area now occupied by fluid becomes relatively greatly reduced.

CONCLUSIONS

Fetal respiration results in the breathing of amniotic fluid. Breathing of abnormal amniotic fluid may result in injury of the lung before birth.

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THE FATIGUE SYNDROME

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BY fatigue syndrome we mean that group of symptoms complained of by patients who experience mental or physical depletion, or both. In this discussion we do not propose to restrict ourselves to those who reveal chronic nervous exhaustion, but will discuss that group of cases with chronic fatigue which is not relieved by average rest. We include, also, the patients whose fatigue is so masked by over-activity that they themselves are unaware of it. Work of itself seldom leads to this chronic condition we are calling fatigue. It is axiomatic that worry, not work, kills. Overwork, therefore, is not a condition to be considered merely for itself but as a symptom of maladjustment. Usually it is not overwork that leads to a nervous breakdown but the nervous breakdown drives the individual to overwork. Frequently overwork is suggestive of a mental conflict. Insomnia is another instance in which the result is often mistaken for the cause.

The psychogenic factors which predispose to these symptoms of overwork, insomnia, and many other complaints are numerous and may be found in many combinations. Anything which sufficiently upsets the mental balance of a person will result in fatigue. Insecurity of home, affections, health, or employment becomes a potent emotional factor producing fatigue. Fear and worry from whatever cause point in the same direction. It is well known that any emotional excess produces exhaustion. This may be largely the result of adrenal deficiency.

More protracted emotional states, such as we are accustomed to describe by the terms unhappiness or dissatisfaction, may reveal themselves less physiologically, but result in a more severe form of exhaustion. Frustration, a feeling of a lack of purpose in life or its incompleteness lead to chronic depletion of energy. Indecision is a great waster of energy, and has a cumulative effect which leads to a chronic inability to make decisions and to consequent self-depletion. People can tire out from monotony or from repetition of routine, especially if it is below their mental capacity. This is seen in school children who have a capacity beyond their grade, but are held back in order to fit into the routine of school life. School fatigue may not necessarily be due to an excess of lessons but may result from a continuous activity of the body and mind, such as is frequently found in boarding-schools.

An even more potent factor producing fatigue in modern life is over-stimulation; a highly stimulated person is constantly demanding more stimulation. Over-stimulation is a matter of over-awareness and too great an attempt to respond to the stimuli. Alcoholism may be another result of over-stimulation or monotony, but it is usually a means of escape rather than an end in itself. Alcoholism, the use of drugs, religious fanaticism, temper-tantrums, and sui-

cide are indicative of psychopathology. The emotional disturbances inciting these conditions frequently show themselves early, in the reaction of fatigue. The temperament of the individual plays a rôle in the expression of fatigue; a nervous temperament favours quick fatigue, and repeated fatigue makes a vicious circle by increasing nervous instability. Anxiety may be a protracted but legitimate form of worry, in that it is a search for a way out of a difficulty. There is, however, a less productive and quite as chronic form of anxiety which is expressed by abundance of activity, commonly called "fussing". "Fussing" is one of the most fatiguing forms of activity, because of lack of direction in the expenditure of energy.

All of these psychological phenomena have physiological correlates; somatic changes correspondingly alter mental states. No matter which comes first, the entire organism is involved. The difficulty which the layman, and too frequently the physician, dismisses as "just nerves" may be physiologically as well as psychologically real and important, in spite of physical findings being absent on ordinary examination.

Many endocrine disturbances also play a rôle or even the important part in the fatigue syndrome. It is well known that emotions produce circulatory and endocrine disturbances. Chronic anxiety is said to induce adrenal insufficiency.

Thyroxin has for its chief function the sensitization of every cell and organ in the body to sympathetic stimulation. This stimulation, in turn, is largely under the control of the adrenal medulla which secretes adrenalin. Thus, overactivity of the thyroid is manifested by an over-excited sympathetic nervous system, resulting in increased cellular metabolism. Hypothyroidism is often an underlying cause for the fatigue which is primarily the result of a slowing of metabolism. The signs of dry, brittle, or scanty hair, dry skin, flatulence, menorrhagia, and chronic constipation are at least as reliable in the diagnosis of this condition as is the basal metabolic rate. In the state of advanced hypothyroidism the patient becomes dull, apathetic and slow. Mild cases of hyperthyroidism, on the other hand, may also be accompanied by tiredness. Probably the explanation of this early fatigability is that the excess of thyroxin (here generated) sensitizes the cells to adrenalin, which, in turn, depletes glycogen storage in the muscles and the liver. In physically fatigued animals fatty changes have been seen in the cortex of the adrenals. In hypoadrenalism the blood pressure is usually low and there is an increased fatigability from muscular activity. This might be compared to a very mild form of Addison's disease. In the latter there is a definite clinical syndrome of weakness, hypotension, pigmentation, and gastro-intestinal disturbances.

Dyspituitarism, especially of the anterior lobe, is frequently associated with fatigue. Some of this fatigue may arise from the lack of the nitrogen metabolic hormone which increases the specific dynamic action of proteins. The anterior lobe of the pituitary gland also acts through the fat metabolic hormone, thus increasing the fat metabolism. Besides the possible effect of hormones enlargement of the pituitary gland may press upon the sleep centre, producing an excessive drowsiness. Fatigability and weakness are given as some of the major symptoms in the Cushing syndrome of the basophilic adenoma.

Hypogonadal changes are said to be associated with fatigue. We know that after castration an animal is more sluggish. Adolescent fatigue occurring at puberty is more probably associated with a marked increase in development and weight than with endocrine disturbances. In the late stages of hyperpituitarism, hypergonadism, hyperadrenalism, and hyperthyroidism these various glands become exhausted and produce muscular weakness and early fatigability. Muscular weakness is often seen in Simmond's cachexia and Addison's disease.

Myasthenia gravis is a disease in which fatigue occurs early in the muscles. Little is known of its etiology, but it may be associated with exophthalmic goitre, and is improved by the giving of epinephrin or ephedrin. This point suggests that it is closely associated with the adrenal gland. Some writers have considered the pathology to be a disturbance of the muscular metabolism, but we have very little evidence to support this theory. Hypertrophy of the thymus has been observed, and treatment of this occasionally gives good results.

It has long been said that fat people are "lazy". It was thought that there was a close association between the laziness and the development of fat. More recent work has shown that in the obese person there is a decreased specific dynamic value of proteins and carbohydrates; in other words, such a person does not get the same energy value out of his food. On the other hand, he does much extra work in carrying himself about, and thus is fatigued more quickly. In my experience obese persons are not "lazy", but are, as a rule, hyperactive, especially if we consider their increased weight. Obesity may be due to pituitary, gonadal, thyroid, or adrenal disease. Many cases, however, are simply the result of over-eating. They are all to be ascribed to the result of excessive food intake over energy expenditure.

Often after acute infections such as tonsillitis, pneumonia, and especially influenza, there is a degree of exhaustion which is out of proportion to the apparent illness of the patient. In some of these cases it has been shown that there are hæmorrhages and areas of degeneration in the adrenal cortex. At least, some of these patients are benefited by the administration of ephedrin. Neurocirculatory asthenia is a syndrome in which fatigue, shortness of breath, and neurocirculatory disturbances are the chief findings. The underlying disturbance is an excessive stimulation of the adrenal and sympathetic nervous system. Crile has been able to improve these patients by adrenal denervation. The psychic disturbances in the etiology of this state have been sufficiently stressed. In this condition we find symptoms similar to hyperthyroidism except no increase in metabolism.

Often we find fatigue and allergy in the same patient. At the time of an asthmatic attack the fatigue in such people seems to be out of proportion to the true severity of the condition. People with allergic states do not commonly show essential hypertension or spastic changes in the smooth muscle. The absence of these suggests a hypoadrenalism as the basic defect. It is commonly recognized that liver insufficiency is often associated with mental dullness and irritability. This is probably the result of bile products in the blood. Acidosis often is associated with dullness and sluggishness. These symptoms may be due to a carbohydrate deficiency such as we see in protracted hyperthyroidism, or, on the other hand, they may be caused by the presence of acetone bodies in the blood, which in excess will produce coma, as happens in diabetes mellitus.

Certain general diseases, such as tuberculosis, anæmia, arteriosclerosis and sensory defects, especially eye-strain or deafness, result in early fatigability. Chronic constipation in some people will produce sluggishness, headache, and a feeling of being under par, whereas in other people it apparently has no such effect. This is not the result of absorption from the bowel but of a rectal reflex, for the same effects can be produced by distending the bowel with absorbent cotton. Constipation can often be looked upon as a symptom of fatigue rather than as producing the fatigue itself. In most of these cases one finds a spastic type of colon, although in hyperthyroidism atonic constipation may be seen.

There are a few manifestations which I wish to stress specially, since too often they are viewed as a cause rather than a result of fatigue. It seems to be generally conceded that the early stage of essential hypertension is an arteriolar spasm. The tendency to spasm is possibly an inherited trait and is made worse by nervous or physical exhaustion. Chronic anxiety is a potent factor here also. One frequently sees essential hypertension in the high-strung nervous person who has developed chronic anxiety. We often find temperature elevation in states of nervous exhaustion, hyperthyroidism, anæmia, as well as in infectious diseases. Pyloro-spasm, ileocæcal spasm, and ano-spasm, as well as cardio-spasm, can be attributed to emotional disturbances. and are thus prone to occur in the fatigue state. Pyloro-spasm is often difficult to distinguish clinically from gallbladder disease. Moreover, ileocæcal spasm is frequently diagnosed chronic appendicitis. The rest necessitated by an operation may produce an apparent cure, usually attributed to the surgery *per se*. However, the result would be better if no operation were performed on the patient and he had taken his weeks of rest on a sounder pretext.

Although we have dealt at length with organic diseases producing fatigue, the etiological psychic disturbances are more commonly major problems. However, underlying endocrine or general systemic diseases predispose to a state of exhaustion. The treatment of the fatigue syndrome depends entirely upon the etiological factors concerned. We must obtain knowledge

of these from the complete history and physical examination, with due consideration of the changes which suggest endocrine imbalance. Often the patient may think the real cause is unimportant, and, unless questioned closely, will avoid the discussion of his psychic disturbances. The procedures of mental hygiene are of primary importance in treatment.

One of the major methods of therapy is to regulate the patient's life with regards to rest, activity, and eating. Irregularity in these respects is very common. Rest before midnight is valuable to stress, for the patient who avoids it will not likely get adequate sleep. On the other hand, we must not forget that bed rest does not necessarily give rest. One must remember that relaxation is not always obtained by inactivity, but may follow upon a sense of freedom to follow impulses of the moment. The Moslems, Quakers, and the Oxford Group do benefit their members by insisting on a time for meditation. Time to oneself to muse and think is beneficial. The doctor may wonder why his patient does not improve with bed rest, failing to realize that the patient is not necessarily resting because he is in bed.

The meals of these patients should be concentrated, of high vitamin content, and given at regular intervals. If there is much dyspepsia, it may be wise to give a little food frequently. Sedatives are of real value, and should be given in large doses, in order to ensure sleep. Insomnia may prove to be the result of continued sympathetic control during the night. We should choose our sedatives with due regard to the action which we wish them to have. If the action should be prolonged, then use a sedative with a prolonged effect, and give repeated doses. We should not try to make the patient feel "dopey", however, as he is apt to resent this. Any endocrine disturbance should be treated with appropriate forms of biological products. Most of the endocrine products are so expensive that very few can be named that lie within the price range of the average purse. One may use extracts of anterior lobe pituitary, thyroid, and possibly a few others. Fortunately, the giving of one glandular product influences the action of other glands, stimulating or depressing them according to the product given.

Removal of foci of infections should not be looked upon as a cure-all. However, if we are dealing with definite foci of infections they should be removed so that the general health of the patient may be improved.

SUMMARY

There are many causes of chronic exhaustion. Each patient presenting the exhaustion syndrome must be studied from the viewpoint of psychopathology, endocrine imbalance, and general systemic disease. Pathological lesions having a bearing upon this syndrome may be found in more than one of these fields. Moreover, we must avoid thinking of the psychological and somatic factors as separated. Treatment must be considered not merely in terms of conditions but in terms of the entire individual in his social setting.

INDICATIONS FOR TONSILLECTOMY.—K. Vogel reports from the University Nose and Throat Department of the Charité Hospital in Berlin the attitude he and many of his colleagues adopt towards tonsillectomy for the relief of various local conditions, such as chronic tonsillitis, and of more general conditions, such as rheumatism. The figures Professor Vogel quotes are from Frankfurt and have already been published (*Med. Welt*, 1936, No. 49). They showed that tonsillectomy was followed by recovery in 72 per cent of the cases of articular rheumatism and by improvement in 15 per cent. The recovery rate was as high as 94 per cent in cases of acute articular rheumatism, whereas in chronic articular rheumatism only 52 per cent were cured and 30 per cent were improved after tonsillectomy. After quoting percentages of recoveries and improvements following tonsillectomies performed for other ailments, including rheumatic heart disease, glomerulonephritis, and gastro-intestinal disturbances, etc., Professor Vogel concludes that relapsing sore throats and tonsillar abscesses are effectively prevented by tonsillectomy provided no diseased portion of tonsil is left behind. Less certain are the effects of tonsillectomy on chronic pharyngitis, laryngitis, and bronchitis originally due to infections of the tonsils, for in such cases the secondary foci established are apt to persist after the removal of the primary focus. To be really effective, tonsillectomy should, therefore, be performed as early as possible. By the time rheumatic polyarthritis, nephritis, endocarditis, etc., have become established the chances of their being cured by tonsillectomy are comparatively small.—*Dtsch. med. Wschr.*, Dec. 24, 1937, p. 1943. Abs. in *Brit. M. J.*

VESICO-INTESTINAL FISTULA

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A COMMUNICATION, direct or indirect, between any portion of the intestinal tract and the urinary bladder is uncommon but not extremely rare. According to Fowler[1] who reported a case in 1929, the number of cases recorded in the literature at that time did not exceed 500. Higgins,[2] in 1936, reviewing the literature and adding a number of new cases, found with his addition that the number of collected cases was then 548. In a comprehensive review of the literature we have found that not many more true cases of intestino-vesical fistula have been added to the records. The preponderance of the cases reported involve the large bowel and are of the sigmoido-vesical, colonic, cæcal-vesical and recto-vesical types, a lesser number being attachment of small bowel and bladder. We have had a case of this latter variety, an ileo-vesical fistula, and as this type is only infrequently seen we take interest in adding it to the literature.

Blanquinque, in 1870, reporting on this condition, first suggested a classification for vesico-intestinal fistulæ, although prior to this time some reference to this interesting condition had been made by writers of medical literature. In 1888 Harrison Cripps published his work "The passage of air and fæces from the urethra", in which he reviewed a collected series of 63 cases. This work is described by R. J. Willan,[3] who also reported a series of cases that had been under his own supervision.

These fistulæ of course, are secondary to some causative factor, and in this respect the classification by R. Gordon Craig and Lee-Brown[4] appears to be most adequate: (1) traumatic and (2) non-traumatic. The traumatic variety may originate from a wound or accident, or it may arise as a result of surgical procedures. The non-traumatic variety may be subdivided into: (*a*) inflammatory; (*b*) malignant; (*c*) tuberculous; (*d*) syphilitic; (*e*) actinomycotic; (*f*) echinococcal and (*g*) amœbic. The inflammatory may be due to: (1) abscess; (2) diverticulitis; (3) stone; (4) stricture; and (5) ulcer.

With reference to the symptomatology it may be said that this condition is accompanied by definite and distressing features comprising the passage of gas *per urethram* (pneumaturia); (*b*) of fæces *per urethram*, and (*c*) of urine *per rectum*. These are generally coupled with frequency and cystitis due to the continuous introduction of fæces and organisms from the bowel. The fistula is often so constituted that only a one-way flow is obtained and little or no evidence of urine passing from the bowel is noted. This factor depends, of course, upon the underlying pathological condition, the organs involved, and the location of the openings between the connecting viscera. In many cases reported urine was present in the rectum in only very few instances. It is likewise true that there may be no fæces in the urine, especially in cases in which there is a minute orifice in the bladder, or in which œdema about the orifice is sufficient to close it partially and thus prevent fæcal material from entering the bladder. As soon as there is a channel between the bladder and the bowel, marked urinary symptoms, such as are associated with an acute cystitis, are evident. Frequency, urgency, extreme irritability of the bladder, with the passage of cloudy urine containing pus, blood, fæces and pneumaturia may be noticed by the patient. It is well to remember, however, that pneumaturia is not pathognomonic of a fistula between the bladder and bowel, as it may be present in bladder infections associated with glycosuria.

The diagnosis is usually established without difficulty. When air and fæcal matter escape with the passage of urine there can be no doubt that a communication exists somewhere between the bladder and some portion of the intestinal tract. It may, however, be difficult to determine the exact site at which the fistula opens into the bowel. It has been stated that if the fæcal material passed from the bladder is dark red in colour and contains particles of solid food it may be assumed that the connection is with the small bowel. If the opening is into the sigmoid or rectum it may be visualized by use of the proctoscope or sigmoidoscope. Roentgen examination with the use of opaque material introduced into the bowel or by cystograms may in some in-

stances produce satisfactory results. Cystoscopic examination will usually reveal the opening into the bladder and its location therein. The findings obtained by cystoscopy, however, vary with the length of time the fistulous communication has existed and with the acuteness of the process. In many cases the fistulous opening is quite easily observed. If, however, there be much generalized cystitis present or considerable œdema surrounding the orifice it may not be readily discernible. In most cases during the cystoscopy, irrespective of the bladder picture, fæcal material is observed passing into it. Gas bubbles may also be seen escaping into the bladder, and often a hissing sound accompanying the passage of gas is heard.

An interesting feature noted in our cystoscopy, but not mentioned by other writers, was the absence of the usual air bubble. This would still be present if the fistulous orifice within the bladder was partly occluded to prevent air introduction passing on through the tract into the bowel, or, of course, if gas had passed from bowel to bladder during the filling of the latter with fluid preparatory for cystoscopic examination.

With reference to the treatment, it may be said that this is essentially surgical, and, if possible, the separation of the bladder from the bowel and closing the openings is the end to be desired. The simple fistula, in which neither bladder nor bowel is seriously diseased, may be resected successfully and the openings into bowel and bladder closed by suture. Surgical procedures, however, will vary in their extent, depending upon the primary pathological process causing the fistula. If the condition is the result of trauma, diverticulum, or non-tuberculous inflammation good results may be expected. If malignancy or an extensive tuberculous lesion is the cause surgical procedures may offer little hope of a cure, but if the condition is not far advanced, and resection of the diseased portion of bowel is also carried out, favourable results can be obtained. Palliative measures may be used as indicated by colostomy, cystotomy, or anastomosis of bowel so as to shunt the intestinal content from that portion involved, thus relieving the patient from an increasingly distressing condition.

The following is a brief outline of a case of vesico-intestinal fistula in which the communication was found to be between the ileum and urinary bladder.

CASE REPORT

G.W., male, aged 22 years, single, came under observation on May 11, 1935, with the following history.

Past history.—Appendectomy in 1929; chickenpox in adult life. Denied venereal disease. A Kahn test, six months previously, was negative. For the past two years he had had a condition diagnosed as "colitis". He would have periods of diarrhœa and occasional pain in epigastrium—this pain coming on at various periods and with no relation to food. It was somewhat sharp in character, never radiating, and when present usually of steady duration. At times he would have relief by making himself vomit. These periods of diarrhœa were often associated with considerable gas in the bowel.

Family history.—Negative.

Present complaints.—Pneumaturia; frequency and nocturia; urgency; burning on urination.

Onset and course.—About one week previously he was awakened in the morning with pain at the external meatus. This was described as the same type of pain experienced when a boil is developing. It was consistent and always felt at the external meatus. It would be relieved for a short time by passing urine, though during micturition he also felt a burning sensation through the urethra. With the onset of this pain he also had frequency of urination, having to void during the day about every one hour and at night two to three times. This condition was present for about three days, and then one morning he found that the pain had disappeared and there was no frequency, and he thought that he was better. Later, when he voided he noticed that some blood was passed (described as a blood clot) and this was followed by some purulent discharge. Following this he had no frequency and no pain until about two days later, when he noticed that he was commencing to pass air from the urethra. Shortly after this he also passed brown-coloured material which had a definite fæcal odour. The pneumaturia increased in quantity and in frequency, and he also had frequent urination, having to void during the day about every one hour and at night two to three times. With the onset of this frequency he also had severe burning which was experienced along the urethra during the passing of the urine. The brown-coloured material that he was passing kept increasing, and he also found that with the desire for micturition he would have to pass urine at once. No more blood was observed.

General examination.—The patient did not appear acutely ill, though he was pale, showed evidence of loss in weight, and did not appear strong.

The physical examination (Dr. C. E. Brown, Vancouver, B.C.) was negative except for some tenderness and slight rigidity in the lower abdomen. X-ray of the chest was also negative and did not show any evidence of tuberculosis.

Proctoscopic examination.—(Dr. C. E. Brown) was negative; no ulcers nor fistulous opening were observed.

Barium enema.—Showed filling of entire colon without hesitation, and barium could be seen passing into the ileum. The markings throughout the large bowel appeared normal.

Cystoscopic examination.—(Earle R. Hall). The urine obtained was cloudy and had a somewhat fæcal odour. The bladder showed some slight generalized cystitis. The usual air bubble was not present. The ureteral orifices were prominent and could be observed discharging clear urine. The trigone was normal. Just above the retro-trigonal recess and encroaching up the posterior wall was a definite circumscribed area of bullous œdema which partially surrounded an aperture in the bladder mucosa. This opening was dark and showed efflux of material dark in colour and some

greyish and mucoid in appearance. With this efflux a slight hissing sound was noticed. Catheters passed up each ureter without difficulty or obstruction. The urines obtained from each kidney were clear. Pyelograms were made.

Urine examination.—Catheter specimens from each kidney were negative; also negative for tuberculosis. The bladder specimen was cloudy, and had a fæcal odour; albumin three plus, sugar 0. Microscopically, showed white blood cells three plus, red blood cells two plus, and many bacteria. The bladder specimen was negative for tuberculosis.

Pyelography did not show any abnormality of the kidneys, both being within normal limits.

A diagnosis of entero-vesical fistula was made and operation advised. This was done in two stages.

First operation.—May 25, 1935 (Earle R. Hall).—A suprapubic mid-line incision was made. A large mass was encountered which was found to involve the urinary bladder. Multiple adhesions were present and, after a careful dissection, the mass was found to be small bowel, and a direct communication between this and the bladder was exposed. The fistulous tract was resected and the openings in the viscera closed. It was evident that the causative factor was a diseased portion of ileum which would require resection. The condition of the patient was not of the best, and it was decided to close up and do a second operation. The post-operative course was uneventful and he had relief from his previous urinary distress, micturition returning to normal.

Second operation.—August 14, 1935 (Norman D. Hall).—Laparotomy by a right rectus incision over the palpable mass was performed. On opening the peritoneum a definite tumour mass was encountered involving the distal portion of the ileum. This area was hard and showed numerous adhesions. The bowel distal to the mass was collapsed and appeared empty, while the proximal portion was somewhat ballooned out. The wall of the involved portion of gut was very thick, and it appeared as if the lumen were almost obliterated. A typical lateral anastomosis was carried out, some eleven inches of the distal ileum being removed, this containing the tumour mass in the mid portion with about one and one-half inches of normal-looking bowel at each extremity. Many adhesions were encountered, a few being attached to the bladder, but at this time no definite close adhesion or connection of small bowel to the bladder could be made out. The usual wound closure was made and an enterostomy tube inserted to protect pressure on the suture line of the anastomosis.

The post-operative course was not very stormy, and the patient's progress was quite satisfactory. His wound healed up quite well, except for a small sinus opening at the upper angle from which the enterostomy tube had entered the abdomen. He was discharged from the hospital.

Pathological report.—(Dr. H. H. Pitts, Vancouver.) "Specimen consists of a piece of small intestine about eleven inches long, most of which is thick and firm. Section shows about one and one-half inches of apparently normal intestine at each extremity. The intervening portion consists of very thick granulomatous-appearing tissue projecting into and nearly obliterating the lumen. This tissue is rather suggestive of neoplastic type.

"*Microscopic.*—Numerous sections were taken at different levels through the specimen of tissue, and they show a definite granulomatous process characterized by well defined tubercle-formation, consisting of epithelioid and giant cells, with occasional small areas of caseation, diffuse lymphocytic and plasma-cell infiltration, and fibrosis. This is seen chiefly in the mucosal and submucosal layers, although the former is quite extensively desquamated, and throughout the remaining coats of the gut extensive fibrosis and this similar granulomatous infiltration is noted. *Diagnosis.*—Tuberculous enteritis." The final diagnosis was vesico-intestinal (ileum) fistula, caused by tuberculosis of the ileum.

Progress report and summary.—At the present time, which is about two years following his discharge from the hospital, the patient has made fairly good progress in his general condition, and his present weight is greater than any time during the past five years. He feels well generally and has no urinary distress. His wound is entirely healed, except for a very small sinus at the upper angle.

The interesting features of this case are that this type of fistula is one of the rarest encountered, being a communication from the small intestine (ileum) into the urinary bladder, the cause of this being a tuberculous infection of this portion of the small bowel. It is also of note that no other system showed any evidence of tuberculosis, and the man had never had any symptoms suggesting involvement of the chest, which was also found to be negative upon x-ray examination. As his general condition has been steadily improving a third operation has been under consideration to attempt closure of the existing sinus, which would then give him a completely satisfactory result from his previous affliction.

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CEREBRAL ARTERIOGRAPHY.—H. Davies describes the technique of cerebral arteriography as carried out at the National Hospital, Queen Square, London, and gives a summary of the different arteriographic appearances in the normal brain and in cases of cerebral tumour or aneurysm. He does not believe that the doses of thorotrast used in cerebral arteriography have a delayed deleterious effect on the body. For the diagnosis of tumours of the temporal lobe and cerebellum, which derive their main blood supply from the basilar trunk, the author's advice is to inject this vessel through the subclavian artery; but as the thorotrast is being injected against the blood stream that part of the artery which is distal to the point of injection is compressed, and this makes the thorotrast flow up the vertebral artery and the basilar trunk. With this technique the branches which supply the cerebellum can be clearly seen.—*Brit. J. Radiol.*, Dec., 1937, p. 871. Abs. in *Brit. M. J.*

VOLVULUS OF THE CÆCUM: REPORT OF TWO CASES

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VOLVULUS of the cæcum has been defined as a condition in which there is torsion limited to the cæcum, ascending colon, and the adjacent portion of the small intestine (Gatellier, Moutier and Porcher[1]).

The condition may develop more or less suddenly and constitute a definite surgical emergency. This type has been well known for many decades; isolated cases are published every year. Diagnosis is proved by the findings at operation for an unexplained acute intestinal obstruction, or by an autopsy. In contra-distinction to this variety, presenting as it does a dramatic clinical picture calling insistently for early surgical intervention, and showing unmistakable designs upon the life of its host, there is a less obvious type towards which notice has been directed in the present century by Corner and Sargent,[2] Sweet,[3] and others. This variety has been recognized in certain cases only and as a result of its terminating in the unequivocal acute type. It has proved possible to argue back in the history and interpret in a new light certain abdominal symptoms to which these individuals as a group were prone. A similar symptom-complex is frequently met by every practising medical man, and an off-hand diagnosis of "chronic appendicitis" is usually made. After seeking to relate the syndrome in question to recurrent and transient attacks of cæcal volvulus, Corner and Sargent sum up in the following words:

> "If we are right, something will have been done to relieve the vermiform appendix of a little of its evil reputation, and perhaps to explain some of those not uncommon cases of recurrent attacks of abdominal pain with fullness and tenderness in the right iliac fossa, constipation, and vomiting, but unaccompanied by fever, which may be brought on by exertion or some other slight cause, and which pass off in the course of a few hours."

It is intended in this paper, first, to present a concise account of the principal features of volvulus of the cæcum, contrasting as far as possible the two distinct types outlined above. Secondly, it is proposed to report two recent, successful cases. Case 1, a personal case, illustrates many of the features of the acute type of cæcal volvulus; Case 2, under the care of Dr. M. G. Peever, of London, is an excellent example of the recurrent variety. It is hoped that consideration of this latter case may shed some light on the way in which physiological disturbances causing symptoms referable to the right lower abdomen may be traced down to a pathological basis other than that generally and carelessly accepted.

Incidence.—A survey of the literature shows that some three to five cases of volvulus of the cæcum are reported each year; practically all of these are in foreign journals. The comparative rarity on this continent may be judged from the fact that Sweet, when reporting a personal case, was able to locate records of only 6 cases in the Massachusetts General Hospital in a period of 57 years; this means approximately one example of the acute and recognized variety each ten years on the average. It has not been possible to find any record of a single case in London (Ont.), either among the records of the Victoria Hospital or from a personal canvass of a number of surgeons and pathologists. An extensive, although not truly exhaustive search of the literature, has failed to discover a record of any case in Canada. (One similar but not identical case was published in 1913 by the late Dr. Olmstead, of Hamilton;[4] in this one the transverse colon was also involved in the torsion, bringing it outside the limits of our definition, although the embryological background must have been like in kind but greater only in degree).

In North America volvulus of the cæcum is much the least common form of volvulus; in certain countries of northern Europe, notably Finland and Russia, its incidence is practically as great as that of volvulus of the small bowel, and much greater than that of the sigmoid colon (comparative figures are quoted by Sweet). It occurs at all ages and in both sexes, but about 70 per cent of cases are in males; both cases reported herewith were males. These remarks

apply to the acute type of case. The true incidence of the milder, recurrent variety is quite unknown.

Etiology. (*a*) *Developmental anomalies.*—The essential feature underlying every case of grossly abnormal rotation of the cæcum is a congenital lack of adequate fixation of the cæco-colon. If possessed of a mesentery this portion of intestine is free to move about, or to be moved, in various ways, making possible a variety of torsions and displacements as a result of the influence of certain forces. Once displaced, the affected part, by its property of inertia, may be pictured as tending to retain the abnormal attitude. A number of anomalies of the colon and rectum are recognized as the primary factors underlying several conditions of the abdomen requiring surgical intervention. Among the five chief members distinguished by Lynch[5] a prominent place is accorded to non-fixation of the cæco-colon. In a classical article, Dott[6] has clearly presented the various derangements of intestinal rotation that may occur and the pathological consequences which may follow.

The explanation of non-fixation of the cæco-colon appears to be comparatively straightforward. Following completion of the second stage of intestinal rotation, in the tenth and eleventh weeks of intra-uterine life, the elongated midgut is suspended from the dorsal wall by a narrow pedicle about the origin of the superior mesenteric artery. During the third stage, a process of fusion takes place between the apposed serous surfaces of the mesentery and the posterior parietal peritoneum. This process normally commences with the duodenum and then extends to involve fixation of the left and finally the right colon. As a result of it the linear "root of the mesentery" comes into existence. The cæcal region is the last to become fixed, inasmuch as the cæcum only gradually acquires its definitive position; usually the adhesive process is completed by the end of the fifth month.

The developmental changes taking place in the region of the cæcum lend themselves to a number of abnormalities. The normal sequence of events may be either incomplete, or, less commonly, excessive in degree. It has been variously estimated that from 10 to 19 per cent of cadavers show a degree of cæcum mobile sufficient to permit volvulus to develop. Sweet has emphasized the presence in these cases of a fixed point about which rotation occurs; this is usually found in relation to some part of the ascending colon. Undue tethering of the terminal ileum may provide a second point of fixation, explaining certain differences regarding types of rotation, as pointed out by Corner and Sargent. There is considerable individual variation in the exact site and extent of these zones of relatively excessive fixation. It may be accepted that developmental anomalies underlie the vast majority of cases of volvulus occurring in any part of the intestinal tract. In the first few days of life it is not unusual to find a very extensive volvulus, resulting from deficient fixation. Later in life torsion may occur in any abnormally mobile segment. In isolated cases anomalous folds, adhesions and vessels have been described as prominent agents.

(*b*) *Acquired factors.*—Corner and Sargent stressed the importance of acquired lateral pouches of the cæcum. These are pictured as arising from the distending influence of gas produced by bacterial fermentation processes where stasis is present for some time. Habitual constipation may well be of note. The type of diet deserves mention, for it is possible that the high incidence of cæcal volvulus in northern Europe may be related to the coarse vegetable diets in vogue among the peasants of those parts. Overloading of the cæcum does seem important, and large meals appeared to have a place in connection with the attacks in Case 2. Adhesions following an inflammatory condition may play a minor rôle occasionally.

(*c*) *Precipitating factors.*—Given these various conditions which allow cæcal rotation to take place, one must still account for the forces actually causing the rotation in one of the accepted manners (three types of rotation are described, according as the twist occurs about a transverse axis, an oblique axis, or the longitudinal axis). The last constitutes a true axial rotation of the sort dealt with by Fagge[7] in his Bradshaw lecture, 1928. Combined varieties also occur. The cæcum is found most frequently twisted in the oblique manner, being directed up towards the spleen. The exact mechanism of the torsion is no more definitely established than many other aspects of this rather vexed question. It is possible that different agents cooperate in regard to the different types of twisting. Several possibilities suggest themselves as likely factors.

As intrinsic causes one may cite especially hyperactive peristaltic movements, such as may accompany diarrhœa or the use of drastic purgatives, and an overloaded cæcum. The pressure of adjacent organs and structures may have some influence; a definite relation to a large pregnant uterus in rare cases has appeared to be more than coincidental. The chief agent is unquestionably the effect of muscular contraction on the part of the abdominal wall; in most examples of the recurrent type it has been found that attacks were particularly prone to follow sudden strains or twists. Occasionally, violent diaphragmatic movements have proved responsible. Passive movements would seem to be unimportant.

In the vast majority of cases it is likely that two or more inciting causes be operating together, a view propounded by Fagge *a propos* of axial torsion of abdominal viscera. The often powerful "mass peristalsis" of the lower small bowel and colon, constituting the motor phenomena of the gastro-ileal and gastro-colic reflexes, acting in conjunction with the active contractions of the abdominal musculature, may easily be pictured as causing distortion, irregular movements, and torsions in such structures as are free to respond to these forces.

Clinical manifestations.—The clinical pictures are in no way distinctive. The acute type of cæcal volvulus presents the features of an acute intestinal obstruction, the degree of acuteness varying from hours to days (explaining the recognition of acute, subacute and chronic cases by Corner and Sargent). The exact constellation of symptoms and signs in a given case will be influenced by many factors, including the variety of torsion, the position of the cæcum, the time factor, and the relative degrees and durations of obstruction and strangulation. Gaseous distension of the cæcum usually gives an early and typical tender, tympanitic swelling, usually in the right lower abdomen. The evidences of such an acute intestinal obstruction of a given duration, and involving strangulation of a medium-length loop of bowel, are too familiar to require detailing.

The characteristic features of the recurrent type have been mentioned already. Typical attacks occur probably a few times each year. The onset may be known to follow some precipitating circumstance. The duration of attacks varies at different times and in different persons from minutes to hours or even days. There may be vague abdominal discomfort and perhaps fullness over the right iliac fossa; or there may be actual pain of either a colicky, generalized sort, or more or less restricted to the right lower abdomen. Constipation may be absolute, but this is observed only in the more prolonged attacks. Spontaneous relief is eventually obtained, it may be along with the passage of a foul-smelling, bulky, liquid stool. Alteration of the pulse or temperature is unusual. Between bouts the general health is characteristically good, but chronic constipation is common.

Course and prognosis.—The effect of the obstruction of both the lumen of the bowel and the blood supply of the twisted segment in the acute type is to lead to increasing abdominal distension and tympanites locally, and progressive general decline of the patient. The rate varies, but the deterioration is inexorable, and the end must be dissolution unless there is surgical aid. The outlook with operative treatment depends on the general state of the patient and the local findings within the abdomen. Early operation, a minimum of interference required, an experienced surgeon, and effective after-treatment, are factors likely to influence the outlook in a favourable manner. Conversely, long delay, necessitating resection of damaged gut, is specially likely to yield a high mortality, while the opposite to any of the above will be prejudicial to the best interests of the patient. So far as I have been able to discover, recurrence has not been noted after successful operative treatment.

In the recurrent type the course is most uncertain; attacks are irregularly spaced as well as variable in severity. Sooner or later these patients tend to develop an attack of sufficient gravity to place them in the acute group as surgical emergencies. In as much as it is quite impossible at present to state the true incidence of this variety of cæcal volvulus any estimate of the proportion of cases that develop the dangerous acute condition must be a matter of pure conjecture. It may be accepted that a very definite risk of this change taking place does exist. No doubt the hazards attending a timely and expeditious interval operation in any

patient with a history of repeated, severe attacks, should be less than those incurred by adopting a policy of procrastination.

Diagnosis.—The diagnosis of acute cæcal volvulus is very seldom made correctly apart from the findings at operation or autopsy. It may be suspected where the characteristic swelling in the right lower abdomen accompanies the clinical picture of a fairly low acute intestinal obstruction. Otherwise the features are simply those seen in corresponding examples of acute intestinal obstruction due to other causes. Rarely, a history of recurring attacks of abdominal pain may offer a clue.

Regarding the recurrent and partial variety the diagnosis probably deserves serious thought much more frequently than is the case. Mild attacks offer no distinctive signs or symptoms as compared with many more common causes of vague abdominal discomfort. Irregular spacing of such attacks over several years is suggestive. Characteristically, the onset of each attack may be related to some constant factors; the nature of the attack favours a mechanical rather than an inflammatory intra-abdominal lesion, and the duration is brief. The individual features previously listed should be sought. Any hope of accurate diagnosis in the early stages demands a most thorough analysis of (*a*) the history of repeated attacks, and (*b*) the special characters of the first and each subsequent attack. Careful consideration of every possible case, with special relation to the precipitating causes, sequence of events, duration and termination of all attacks may be expected in time to yield a certain number of correct positive diagnoses before operation. During the attack a barium x-ray examination may be of value.

It is impossible merely to mention all of the differential diagnoses. As a rule true appendicular inflammation can be excluded by the transitory nature of the attacks (inflammation in a deeply-situated viscus will usually last a day or two at least, and symptoms arising from such a condition are likely to have a longer duration too), and by the entire absence of fever. Symptoms related to functional abnormalities of the ileo-cæcal valve are likely to occur frequently and be short-lived. Discomfort arising in a constantly overloaded cæcum, as where stasis accompanies a chronically costive state, will occur frequently and be unlikely to initiate severe attacks. Every detail must be assessed in an attempt to pick up instances of partial and recurrent volvulus of the cæcum.

Treatment.—The acute variety calls for urgent operation. Once the true nature and degree of the torsion have been estimated, the aim is to restore the parts to their *status quo ante,* relieve the obstruction and the vascular interference, deal with hopelessly damaged gut as necessary, perhaps provide drainage of the bowel, and, possibly, fix the mobile cæcum. The choice of operative procedure is dictated by the condition of the patient, the state of the strangulated loop of intestine and of the obstructed bowel above this level, and by the operative experience and facilities of the surgeon. Many cases require a preliminary deflation of the ballooned cæcum before detorsion can be accomplished. Advanced cases merit cæcostomy, a procedure also widely recommended as a means of fixing the cæcum and ensuring against a later recurrence. A gangrenous cæcum may demand resection, but this should never be completed at one stage in an ill patient with such a condition; temporary drainage of the open ends after rapid excision, followed by a later anastomosis (various methods may suit different cases), will offer a far greater chance of success.

Every case calls for all the supportive and general measures applicable to patients suffering from the effects of acute intestinal obstruction; shock, dehydration, a disturbed chemical equilibrium of the blood, and possibly diffuse peritonitis, must all be combated. All procedures chosen should be inspired with the purpose that life be saved, good health be regained and retained, and recovery be accelerated safely where possible. The aims must follow the order listed.

The recurrent type of case also calls for operation. Urgency need not be a factor. Non-fixation of the cæco-colon must be remedied, perhaps best by suturing to the anterior abdominal wall. Cæco-plication, following appendectomy, may have value as an adjuvant measure, for in most of these the cæcum is of the large, saccular variety.

CASE 1

F.P., male, aged 61, farmer, of English and "Pennsylvania Dutch" extraction.

Past history.—Not significant apart from symptoms of an active chronic peptic ulcer for many years, with severe hæmatemesis and melæna on one occasion 14 years ago (all symptoms absent for last 6 years), and one attack of hæmaturia, with "gravel", and pain of right

renal character and distribution, 4 years ago. No other illnesses of note and no other memorable attacks of abdominal pain.

Present illness.—Gradual onset of lower abdominal pain about 5 p.m. on August 7, 1937. He had just completed an afternoon of riding on the disc harrows over a particularly rough piece of farmland. The pain was confined to the middle region of the hypogastrium and was apparently steady at the commencement. Soon it acquired a "crampy" character, with bouts which were brought on by active movements and relieved by lying on the right side with that thigh flexed. Vomiting occurred on three occasions, first about midnight; the vomitus was not unusual. He was unable to sleep. The bowels did not move, but he thought that some gas was passed during the night.

Physical findings.—I saw him some 18 hours after the onset. He was lying curled up in bed on his right side, and resisted moving or being disturbed. Temperature, pulse and respirations were not at all abnormal. The abdomen moved little with respiration, especially in the right lower quadrant; a well-defined, tender, resonant swelling underlying the right lower rectus muscle was made out on palpation. This felt about the size of an orange, but it was somewhat obscured by some spasm of the overlying muscle. The leukocyte count was 13,000, with 66 per cent neutrophils. The urine contained traces of both albumin and sugar. The other clinical and laboratory observations were normal.

The pre-operative diagnosis was acute appendicitis; the mass was thought to be inflammatory, probably œdematous omentum and cæcal wall, in spite of the shortness of the history, etc.

Operation.—The abdomen was explored through a right lower para-rectal incision; all intercostal nerves were zealously preserved. The cæcum and adjacent portions of small and large bowel were involved in a complete 360° twist in a clockwise direction; the ileum entered in approximately the normal situation, but it reached this site by winding tightly about the region of the torsion. The cæcum was distended to a size exceeding a fetal head; its wall was markedly engorged, but it was perfectly viable, and the circulation was readily restored. The appendix appeared anteriorly; it was similarly congested. Detorsion was performed, and the gas gurgled freely on along the lumen of the colon. It was now seen that the mesentery of the terminal ileum continued on as a continuous sheet to include a mobile cæcum and some one and one-half inches of the ascending colon. The colon was relatively firmly attached at the point of cessation of this mesenteric connection. In as much as the cæcum was grossly distended it was decided to do a plication, suturing the anterior and lateral tæniæ together, thus causing marked diminution in the size of the viscus. No fixation was done. The appendix was removed; it contained numerous thread-worms. Recovery was uneventful. The patient was discharged free from all symptoms on the 18th day.

CASE 2

J.C., male, aged 25, farmer, of Irish stock.

Past history.—A definite history of recurring attacks of abdominal discomfort or pain covering a period of 18 years. It was not possible to establish all the details concerning the first attack; apparently this occurred when he was 7 years of age; it was believed to have been severe. He was kept in hospital for about 6 days, under observation as a case of acute appendicitis. Operation was avoided because of a coincident whooping-cough. Since that time he had been subject to up to three attacks each year. The free intervals fluctuated between two weeks and one year.

The attacks were variable in intensity, and lasted from ten minutes to two hours. The onset was gradual and often related to eating an unusually large meal; there was no constant time relation. Sometimes vague discomfort was felt; at other times "cramps like gas pains" would double him up. Vomiting accompanied four of the most violent attacks. Recovery would take place spontaneously and rapidly. He was unaware of any circumstance which appeared to influence these attacks in any precise manner. He suffered from constipation rather spasmodically, but not in relation to the attacks at least not noticeably. The last attack occurred one year previously.

Present illness.—After feeling well all day, August 9, 1937, he gradually developed generalized crampy abdominal pain, starting two hours after his evening meal. The characters at the onset were identical with those of his former attacks. This pain persisted with very little change during the subsequent three days. It seemed to become worse in the lower abdomen, and when he attempted to lie on the left side. Vomiting occurred infrequently. He stated that there was no passage of either fæces or flatus per rectum.

He was admitted to hospital on the third day, when it was recorded that there was only moderate abdominal distension of a diffuse type, with some corresponding tenderness which was not sharply localized. He was unable to void. A catheter specimen of urine showed albumin 3 plus, with occasional red blood cells and pus cells. Hot applications to the abdomen gave some relief, while repeated enemata obtained a little gas but no fæcal matter. It was felt that his generally poor condition, along with the small amount of albuminous urine, indicated a late stage of renal failure, and he was treated expectantly for four days. The pain continued with slight oscillations, and his general state varied little until the fourth day. There was some dysuria, with occasional dribbling of a very few ounces of urine, and almost none to be found on catheterization. The leukocyte count ranged about 14,000. The temperature, pulse and respiration remained about normal.

On the 16th, one week after the onset, his condition suddenly began to deteriorate. He felt very poorly. The distension increased steadily. The pulse rose to over 120, temperature to 101°, and respirations to 26. Now enemata elicited no response whatever. The urine was re-examined and found to be albumin-free. It was realized at once that an acute abdominal condition was present.

Operation.—The peritoneal cavity was found to contain a moderate excess of sero-sanguinous fluid. The cæcum was described as "enormously dilated": it was rotated in a clockwise direction a little over 180°, causing the appendix to present anteriorly. The cæcum filled the entire pelvic cavity as well as most of the abdominal space. It was emptied of several "dishes" of liquid fæces by means of a trocar. Detorsion was performed, followed by cæcostomy. The cæcum was judged to be viable. As with the other case, a definite extension of the mesentery to the cæcum, and most of the transverse colon in this instance, was noted.

Following a stormy period this man went straight ahead. At the time this is written, nearly a month after the operation, he is almost ready to get up out of bed, and his wound is practically dry.

SUMMARY AND CONCLUSIONS

1. Two distinct types of cæcal volvulus are described, and a recent, successful case illustrative of each is reported.

2. The two types are considered in some detail regarding etiology, clinical features, prognosis, diagnosis, treatment, and other aspects.

3. The essential factor underlying practically all cases is a developmental anomaly in the form

of non-fixation of the cæco-colon. The relevant embryological aspects are discussed. Certain acquired factors are mentioned, and an attempt is made to elucidate the various forces which actually produce the torsion of the mobile cæcum as well as those which permit its occurrence.

4. The acute type appears essentially as an obscure and uncommon form of acute intestinal obstruction. Correct diagnosis is very unlikely, apart from the operative or autopsy findings. The recurrent variety occurs in the form of repeated attacks of abdominal symptoms which vary considerably in different individuals and at different times. It would seem that the diagnosis has never been established before a case has terminated in an attack of the acute type, when retrospect permits a more intelligent analysis of the history.

5. It is pointed out that it is both possible and probable that many cases of recurrent symptoms referred to the right lower quadrant of the abdomen, and usually carelessly classified as "chronic appendicitis", are really examples of temporary or partial volvulus of the cæcum. Certain points of value in differentiating such mechanical conditions from those with an inflammatory basis are mentioned. These cases merit a searching history, with special consideration of every aspect of their attacks in order to seek a true diagnosis. Where operation is performed, and such findings as a normal appendix with a saccular non-fixed cæcum leave room for doubt, the advisability of diminishing and/or fixing the cæcum deserves thought.

6. Treatment must be operative in either type. It must be early in the acute variety and adjusted to the needs and recuperative powers of the particular patient. The after-care is also important.

I wish to gratefully acknowledge the kind permission of Dr. M. G. Peever to give the details of Case 2, which was under his care.

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ACARIASIS OF THE URINARY TRACT CAUSED BY HISTOGASTER

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THE ordinary textbook description of cystitis rarely mentions mites as a cause. In the more specialized books on urology mention is made of parasites in the bladder but little space is given to any parasite other than Bilharzia.

Finding numerous mites in the urine of the case I am here reporting led me to search the literature of the last few years without success for case reports of a similar nature.

Chandler,[1] however, states in his textbook, "There are records of mites which are not normally parasitic at all, living and multiplying in the human bladder . . . Cases of parasitism of the intestine and urinary tract with mites of the family of Tyroglyphidæ and Tarsonemidæ are not infrequent."

The case I am reporting is as follows.

Miss C., aged 11, was brought to the office complaining of frequent desire to pass water. This had been present for the last three weeks. At times this desire would be every few minutes and the urge to urinate would still be present after the act. At other times she would be free for half a day or more. Lately she had had fewer periods of freedom and two miserable days forced her to consult the doctor.

Examination revealed a normally developed girl with no constitutional disturbance. In fact, she looked extremely well as she had just come back from a winter in Florida. The throat, chest and abdomen were negative. The urethral opening showed no signs of inflammation. A sample of urine was collected and she was given a simple potassium citrate mixture and told to return for further investigation the following day. Urinalysis showed a neutral urine with no sugar or albumin. Microscopic examination of a centrifuged sample showed epithelial cells in abundance and many pus cells. Several little mites about the size of scabiei were seen swimming around in the urine. The

drawings made of these are reproduced here. On the following day a very careful examination was made of the external parts for any trace of parasites, but none was found. A catheter specimen was taken and the living parasites were again easily demonstrated in the urine. A diagnosis of cystitis due to these parasites was made.

The girl was treated by thorough irrigation with boracic solution and one ounce of 5 per cent aqueous solution of mercurochrome was left in the bladder.

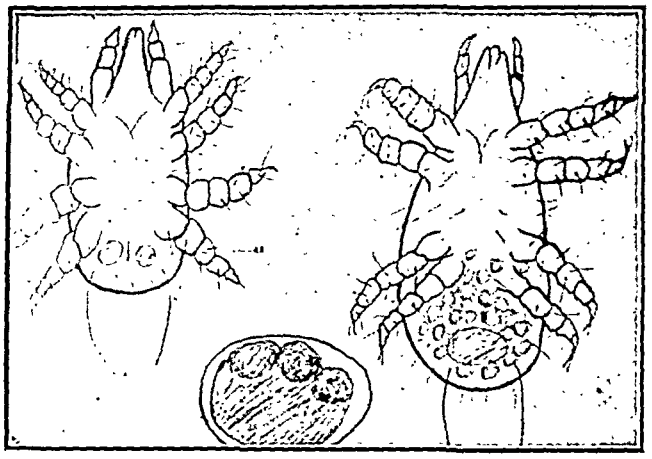


Fig. 1.—Male and female mite and mature ovum. Two round anal suckers are seen near the anus in the male. Many immature ova were present in abdomen of female.

After the first treatment there was almost complete cessation of symptoms. She was given three other treatments with one-day interval, and then kept under observation. No more parasites or ova were ever found in the urine and the patient has been completely cured.

With the aid of some friends in the Department of Biology the mite was classified as follows:

Phylum.—Arthropoda (jointed limbs).

Group.—Acarina (4 pairs of legs, 3 parts of body coalesced).

Family.—Tyroglyphidæ (no eyes, no trachea, 5 segments in legs, pedipalpi 3 segments).

Genus.—Histogaster (males have suctorial pores in abdomen).

Just how the mites got into the urinary bladder is difficult to understand. As the Tyroglyphidæ are found in cheese and all cereals their presence in the intestinal tract is easily explained. Patton[2] suggests that the mites burrow from the rectum to the bladder. This does not seem to me a reasonable explanation in the case of the female where the rectum is separated from the bladder by the uterus and broad ligament. It is much more reasonable to believe that the mites have a tendency to wander into cavities, and that they migrated from the anus to bladder and there reproduced.

My first impression on seeing this mite was that the cystitis was caused by bites or wounds made by the parasite, similar to the burrows of *Sarcoptes scabiei.* Chandler suggests that the irritation is caused by a specific poison secreted by the mite rather than by any wound it produces. The ease with which this case was cleared up, strongly supports the latter view.

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MANDELIC ACID IN THE TREATMENT OF PYURIA*

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A SURVEY of the literature on the treatment of pyelitis or pyuria during the past twenty years reveals that the methods employed were usually conservative and the drugs used were numerous. The drug therapy has consisted in the administration of alkalies, acids, acids alternating with alkalies, dyes, such as gentian violet and pyridine, urinary antiseptics, high vitamin diet, autogenous vaccines, and bacteriophages. Surgical procedures have consisted of pelvic lavage and ureteral drainage. Clinically, it is recognized that the patient is cured when there are no fever or urinary symptoms, and the urine has become pus-free though not always bacteria-free. With the use of any of the above therapeutic measures it has been possible to cure acute pyuria, but in treating persistent or chronic pyuria, that is, pyuria associated with obstruction in the urinary tract, the results have been indifferent.

It was recognized by Pasteur as early as 1879 that the life of the microbe was influenced by the acidity of the culture media, and in 1881 Koch used alkalies and acids as germicides. In

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1917, Shohl and Janney[1] demonstrated the hydrogen-ion concentration or reaction of the urine which would inhibit the growth of organisms. They found, first, that the average reaction of the urine of a person on a mixed diet varied from a slightly acid reaction of pH 6.0 to a neutral one of pH 7.0, and, secondly, that organisms of the colon group and staphylococci were inhibited in growth when the acidity of the urine was as acid as a pH of 4.6 to 5.0, or as alkaline as a pH of 9.2 to 9.6. These *in vitro* experiments led to the belief that growth of bacteria would be inhibited when large doses of alkalies such as potassium citrate and sodium bicarbonate were administered, or when large doses of acid-forming salts such as ammonium chloride were administered to produce an acid urine. However, Helmholtz,[2] giving large doses of alkali by the mouth, was unable to produce an urinary alkalinity greater than pH 8.6, which was less alkaline than the pH at which the colon bacillus grows well. The cures obtained in acute pyuria have been due to self-limitation of the disease, and in addition some of the drugs as potassium citrate and ammonium chloride act as diuretics.

Urinary antiseptics have been used since 1895, when Nicolaier[3] gave hexamethylenamin. The urine was rendered acid by prescribing either ammonium chloride or acid sodium phosphate, and in this acid urine formaldehyde is liberated. The liberation of formaldehyde took place in the bladder, as Hinman[4] found in 23 specimens of urine obtained directly from the kidney pelvis by ureteral catheter that 18 urines had no formaldehyde, while 5 showed mere traces that were devoid of any antiseptic value. He also examined the formaldehyde content of 318 specimens of urine in patients receiving 15 grains of methanimine t.i.d. and in 64 per cent the concentration of formaldehyde present had no antiseptic value. The use of urinary antiseptics requires restriction of the water intake to obtain a sufficient concentration of formaldehyde. The results of treating with urinary antiseptics have been variable, the failure being in part due to urine that has not been acid enough and to an inadequate concentration of formaldehyde.

In 1931, Clark and Helmholtz[5] showed that the urine from a patient on a ketogenic diet was bactericidal when the acidity of the urine was more acid than pH 5.6. In 1933, Fuller[6] demonstrated experimentally that the principal factor of the ketogenic diet inhibiting the growth of bacteria in the acid urine of a patient on a ketogenic diet was due to alpha-beta-hydroxy-butyric acid. This ketone body was bactericidal in a concentration of 1.5 per cent and inactive when the urinary reaction was more alkaline than a pH of 5.6. In hope of simplifying the treatment alpha-beta-hydroxy-butyric acid was given by mouth. This was ineffective, due to its oxidation in the body to water and carbon dioxide.

Finally, Rosenheim,[7] in 1935, after experimenting with several organic acids similar to the ketone acids, found that mandelic acid when administered orally was excreted unaltered by the kidneys, and in sufficient concentration for bactericidal action, providing the urine was acid enough. Helmholtz and Osterberg[8] later found that sodium mandelate, *i.e.*, the sodium salt of mandelic acid, was bactericidal when mandelic acid was excreted in a concentration of 0.25 to 1 per cent in the urine and the urinary acidity was more acid than a pH of 5.8. To produce this acidity, ammonium chloride was administered with the sodium mandelate.

In the treatment of a series of cases of infection of the urinary tract at the Hospital for Sick Children, Toronto, sodium mandelate with ammonium chloride was first used, but later ammonium mandelate was given. The dosage of sodium mandelate prescribed varied with the age of the child and was as follows:

Age	*Sodium mandelate*	*Ammonium chloride*
Up to 2 years	10 – 15 grs. t.i.d.	10 – 15 grs. t.i.d.
2 to 5 years	20 – 30 grs. t.i.d.	20 grs. t.i.d.
5 to 12 years	30 – 40 grs. t.i.d.	20 grs. t.i.d.

Ordinarily, with this dosage of ammonium chloride the acidity of the urine was pH 5.4 to 5.6 within a few days. If not, the dosage of ammonium chloride should be increased gradually to 100 – 120 grs. daily, or till the required acidity is obtained.

Ammonium mandelate, *i.e.*, the ammonium salt of mandelic acid, was later introduced to eliminate the giving of ammonium chloride. The dosage is as follows:

Age	*Ammonium mandelate*
Up to 2 years	drs. ½ – drs. 1. t.i.d.
2 to 6 years	drs. 1 – drs. 1½, t.i.d.
6 years and up	drs. 2, t.i.d.

With this salt it is important to determine daily the acidity of the urine, and if the required acidity is not obtained ammonium chloride should be given in addition. The maintenance of a more acid urine than that with pH 5.6 is one of the most important requisites of the treatment, because, as has been mentioned before, if the urine is more alkaline than pH 5.8, the drug will not produce a sterile urine. The acidity of the urine is easily determined by adding 5 drops of methyl red to 5 c.c. of urine. At pH 5.3 the urine turns a bright red, which is the required acidity, while in a more alkaline urine the methyl red turns the urine a bright yellow or orange colour. Indicator papers may now be obtained to determine the correct acidity of the urine. In addition to the drug treatment the diet of the child should be supervised, and during the period of treatment no citrus fruits allowed, or alkaline drugs, as they produce an alkaline urine. In some cases where difficulty is encountered in rendering the urine acid, as in infants on a milk formula, it has been found that acidifying the milk feeding with 1 teaspoonful of N/10 HCl to 10 ounces of milk mixture has aided in reducing the urine to the required acidity. If there is difficulty in older children during the period of acidification, more foods which give an acid ash, such as meat, fish, eggs, cereal, bread, prunes, plums and rhubarb might be given, while base-forming foods such as vegetables, milk, and cheese might be restricted. Sugars, starches, syrup, tapioca and butter are neutral. It has been advocated in the treatment of adults that fluids should be restricted to 1,200 c.c. daily. In this series there was no fluid restriction.

THE RESULTS OF SODIUM MANDELATE THERAPY

During the past 17 months 52 cases of infection of the urinary tract have been treated in the Hospital for Sick Children, Toronto. Of these, 31 cases were acute pyuria and 21 were persistent pyuria, as determined by intravenous pyelograms. There were 13 patients under 2 years of age, 16 from 2 to 5 years of age, and 23 from 5 to 13 years of age. In this series the organisms present in the urine were *B. coli*, except in 6 cases in which they were *B. paracoli*, 2 cases in which they were *Staph. aureus*, and in 2 cases, dysentery, one of which was a *B. flexneri*. It has been reported that coccal infections in adults are more resistant than those of the colon group to mandelic acid therapy, but this has not been found to be the case in this series. None of these organisms was resistant to treatment.

Of the 40 patients treated with sodium mandelate and ammonium chloride 50 per cent had a pus-free and bacteria-free urine in from 1 to 7 days after the reaction of the urine was more acid than a pH of 5.8. In 38 per cent sterile urine was obtained in from 8 to 34 days, while in 12 per cent there was no response to treatment. In some, the failure was due to nausea and vomiting of the drug, while in others it occurred where there was kidney retention due to a chronic interstitial nephritis. In these the kidney is unable to excrete the mandelic acid in sufficient concentration to be bactericidal, and large doses of ammonium chloride did not produce the required acidity of the urine.

Of the 12 patients treated with ammonium mandelate, 58 per cent responded to the drug within 7 days, while 42 per cent required 9 to 28 days. In this series only 2 required ammonium chloride in addition to the ammonium mandelate to obtain the required acidity of the urine. The acute pyuria cases responded to treatment more quickly than did the persistent. Also the drugs reduced the febrile period from the usual 7 to 10 days to 2 to 4 days. Infants were more difficult to treat than older children. Of the 13 infants treated only 3 responded to treatment in less than 7 days, the majority requiring 7 to 30 days. There were 2 patients who did not respond to treatment. On the sodium mandelate and ammonium chloride the majority of infants required acidified milk feeding mixture with N/10 HCl. Those infants treated with ammonium mandelate did not require the acidified feeding.

It is well recognized that any acid which passes unaltered through the kidney may produce irritation of the kidney, as shown by gross or microscopic hæmaturia and evidence of kidney retention. Preliminary experimental work on dogs by Helmholtz and Osterberg[8] has shown that where mandelic acid was given intravenously there was a transient kidney retention, as shown by increase of blood urea and abnormally low urea-clearance test. Continuation of the drug produced no further harmful effects. Of those treated in this series only one had a transient microscopic hæmaturia, with slight in-

crease in the non-protein nitrogen from 32 to 44 mg. The drug was discontinued and the renal impairment cleared up. In others the non-protein nitrogen was determined before and after treatment and no change was noted. It has been reported that the drug causes vomiting and diarrhœa in 10 per cent of cases. In this series there has been no diarrhœa but several children have vomited. This vomiting may have been due to the ammonium chloride as well as to the sodium mandelate. Brasch[9] states that it is seldom necessary to continue the treatment longer than 12 to 14 days, as there is a possibility of producing renal irritation. In all cases in this series the drug was continued for at least 3 weeks after the urine became sterile, in the hope of preventing a recurrence, and no irritation occurred. Also, 4 patients were given the drug over periods from 3 to 9 months with no evidence of renal irritation in these cases.

It has been possible to follow 20 cases from 1 month to 16 months. One case was followed 1 month, 6 cases for 2 months, and other cases for 4 months, 8 months, 10 months, 12 months and 16 months. There was a recurrence of the pyuria in 4 cases, or 20 per cent; 2 recurred within 2 months, 2 at the end of 6 months, and 1 had a recurrence 14 months after the first attack, but with further administration of mandelic acid the kidney infection quickly subsided. In 3 cases, or 15 per cent, there was no recurrence of pyuria, but in 1 at the end of 2 months and in 2 at the end of 12 months there was a recurrence of bacilluria. On direct smear there were no pus cells but numerous organisms. These organisms were the same as the original growth obtained from the urine. Thus in 13 cases, or 65 per cent of the cases followed, there was no recurrence of either the bacilluria or the pyuria.

Brasch[9] reports that mandelic acid therapy was bactericidal in fully 80 per cent of the cases of uncomplicated urinary infection, and failure of bacillary elimination may be attributed to chronic pyelonephritis of long-standing with advanced fibrous changes in the renal pelvis. Of 36 children treated by Newns and Wilson[10] 9 have had relapses. They suggested that perhaps treatment had been discontinued too soon after a sterile urine had been obtained, and recommended periodic short courses of treatment.

COMMENTS

At present mandelic acid seems to be the most efficacious treatment of pyuria in children. In comparison with other forms of treatment it is simpler and yields better results.

In acute pyuria the use of sodium mandelate to clear up the residual bacilluria is not so important as in persistent pyuria, as there is not the same possibility of its recurrence. In persistent pyuria we are dealing with anomaly of the urinary tract as well as an acute interstitial suppurative nephritis, and in many of these cases surgical intervention is necessary to allow free drainage of urine. In our experience we have not been able to cure the bacilluria with surgical treatment alone, and though the pyuria is cured in the majority of cases, the cultures of these urines still grow the original organisms. Knowing that a chronic nephritis can result from a kidney infection associated with a urinary anomaly, it is realized that the focus of infection in the kidney should be removed. This may either be done by the ketogenic diet or by the administration of a salt of mandelic acid. Though the ketogenic diet results in a cure in 66 per cent of the cases treated, it is impracticable in so far as the majority of cases treated by it require hospitalization, and during the course of the treatment gastro-intestinal upsets may occur. Also it is impossible to treat infants by this method. Unfortunately, the use of sodium mandelate has its limitations in cases in which there is kidney retention associated with an anomaly of the urinary tract and persistent pyuria, but irrespective of this it is worthwhile giving it a trial, as the child with an non-protein nitrogen of 44 mg. had a sterile urine at the end of 34 days, which remained sterile for 12 months.

SUMMARY

1. A series of 52 cases of pyuria, of which 21 cases were persistent pyuria, were treated with either sodium or ammonium salt of mandelic acid. The youngest child in the series was 2¾ years of age, while the eldest was 13 years.

2. Forty patients were treated with sodium mandelate and ammonium chloride. In 50 per cent of these the urinary infection cleared up and the urine was sterile in from 1 to 7 days. In 38 per cent it required from 8 to 34 days of treatment. In 12 per cent there was no response

to treatment. The remaining 12 were treated with ammonium mandelate. Of these 58 per cent responded to the drug within 7 days, while 42 per cent required 9 to 28 days.

3. Twenty children were followed for a period of 1 month to 16 months. There was recurrence of the pyuria in 20 per cent, recurrence of the bacilluria in 15 per cent, while in 65 per cent there was no recurrence.

4. Failures occurred in cases in which there was a chronic interstitial nephritis secondary to some anomaly of the urinary tract, intolerance to the drug, and inability to produce and maintain a urinary acidity more acid than a pH of 5.8.

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THE MENACE OF SODIUM BICARBONATE—PLEIONEXY

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TWO recent occurrences again called my attention to the misplaced faith of the laity in the efficacy of sodium bicarbonate for the relief of gastric distress. The first concerned a man of 70 years, who spent most of one night taking doses of baking soda in water because of severe epigastric distress. It was not until his stomach became greatly distended, due to the accumulation of carbon dioxide gas and coincident pyloro- and cardio-spasm, and his respirations so decreased in volume that he was unable to speak, that medical aid was sought. Relaxation of both pylorus and cardia was accomplished, with expulsion of the accumulated gas through natural passages, and relief of intragastric tension and epigastric pain. He has since become fully convinced of the disadvantages of baking soda and of the superiority of other available preparations.

The second occurred a few days later, when a patient whose primary complaint was of a minor surgical nature, gave a history of the use of soda because of epigastric pain. The result was vomiting and a feeling of faintness for some days after the last attack of pain. For some months he had been using a powder containing an unknown proportion of soda. His former physician had been so impressed by the characteristics his gastric symptoms were assuming that he had referred him to a cardiologist, who, after careful studies, found no evidence of any vascular or myocardial lesion. It is certain that the thought that sodium bicarbonate might have been an aggravating factor was not entertained.

Both these men demonstrated a firm belief in the efficacy of a common substance, although failure had been noted and the substitution of other preparations effected definite relief. It was for epigastric distress, in one instance considered anginal in nature, that soda was being used. The discomfort noted following the use of soda, whether vomiting or belching occur, and the great distension observed in the first patient, the direct result of using sodium bicarbonate in the presence of cardio- and pyloro-spasm, have indicated on these and other occasions that there are times when soda, whether taken alone, or in some advertised preparations, relaxes neither the pylorus nor the cardia, and merely intensifies a condition that might otherwise be simply treated.

Other instances of the failure of sodium bicarbonate, whether taken alone or in a powder containing other carbonates, have been noted, usually when the substance has been taken not for the first time and without medical supervision. The common sequence appears to be, first, discomfort or pain, then the taking of soda for relief, often by the teaspoonful dose, then weakness or faintness or collapse; shortly after, when the primary condition has not been

improved but definitely made worse by the soda, the summoning of a physician, to many of whom soda appears so free from harm that clinical studies of its results are scarce. Although some physicians are aware of its aggravating influence when used for acute gastric conditions, it is not uncommon to learn that after the taking of soda sudden death or collapse occurs. The conclusion may be reached that the primary condition, not the aggravation observed after soda, is anginal in nature, and not that soda is a dangerous drug.

Although the local effects are shown by the failure to relieve cardio- and pyloro-spasm and distension, the general effects have received little attention. Instances of tetany have been reported following its use, and, while appreciation of this condition and its causes is encountered, the knowledge of the harmful effects of soda is found in physiological studies apparently far removed from the realm of the gastro-enterologist and cardiologist. Without a knowledge of Barcroft's studies, it is difficult, if not impossible, to understand the danger of such a simple, common substance. Yet the danger exists there, as with carbon monoxide, for each substance interferes with the discharge of oxygen by the circulating hæmoglobin. In this fact lies all the danger of sodium bicarbonate. Barcroft[1] showed that sodium bicarbonate was highly pleionectic in its action upon hæmoglobin. Pleionexy is that condition of the circulating hæmoglobin in which it holds on more firmly to its gathered oxygen than in the normal condition (mesonexy), and so gives off less oxygen to the tissues than normally. When pleionexy is present, whether induced by sodium bicarbonate, dibasic sodium phosphate, or diminished carbon dioxide content,[1] the tissues fail to receive enough oxygen for their needs, and tend to fail in proportion to their oxygen requirements and the degree of the lag of oxygen supply behind oxygen demand. With the onset of pleionexy occurs the development of the anoxæmic condition, which the organism may or may not survive.

The effect of sodium bicarbonate in producing pleionexy is in proportion to the amount absorbed and the ability of the organism to withstand the degree of anoxæmia so produced. Not all degrees of anoxæmia are dangerous, but all tend to produce tissue breakdown, whether the anoxæmia is produced by a rarefied altitude, strenuous muscular exertion, or decrease of the oxygen-carrying power of the blood through sudden severe bleeding. Failure is inevitable if the tissues of the individual cannot endure the anoxæmic breakdown.

Barcroft's finding does not appear to be known to the general medical public, although of fundamental value and of important therapeutic significance. Sodium bicarbonate shifts the dissociation curve of hæmoglobin to the left,[1] decreasing oxygen supply to the tissues, producing pleionexy, a condition which as a result of treatment does not appear justifiable, as immediate interference with oxygen supply follows its absorption.

MacLeod,[2] studying the lactic acid concentrations in anoxæmia and shock, found in animal experiments that ingestion of sodium bicarbonate with food was followed by an increase in the lactic acid content of the blood and urine. As it is accepted that an increased lactic acid content is a definite indicator of the anoxæmic state, MacLeod thus confirmed Barcroft's observations upon pleionexy by showing that anoxæmia followed the use of sodium bicarbonate. The danger of soda lies in the fact that a large dose may suddenly produce, as can exertion, a degree of anoxæmia that the individual may not be able to survive.

McVicar[3] noted the high colour of the lips and cheeks in gastric tetany patients, a feature "probably due to the high percentage of hæmoglobin in the blood and the decreased vasomotor tone of the blood vessels". This feature could also be accounted for by the high saturation of hæmoglobin by oxygen, a feature of the pleionectic state often attributed to "acidosis". The blood holds on to its oxygen, the normal production of carbon dioxide is decreased, and cyanosis may be absent even at the time of failure.

SUMMARY

Although some physicians are aware of the dangers of sodium bicarbonate, having learned by observation the not uncommon sequence mentioned, it seems desirable that Barcroft's finding of the pleionectic tendency of sodium bicarbonate should be more widely circulated, in order that it may be clearly recognized that the danger from sodium bicarbonate can be expressed in one phrase, namely, its anoxigenic capacity, or capacity to produce the condition of anoxæmia (synonym—anoxia), the result depending upon the dose administered and the

resistance of the individual to the tissue breakdown due to oxygen deprivation.

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SILK TECHNIQUE: ITS RÔLE IN WOUND HEALING*

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IN the days before asepsis, when all wounds, unless by fortunate chance, became infected, heavy silk and linen sutures undoubtedly caused persistent infection and chronic sinus formation, and finally had to be removed. Doubtless at that time the ideal suture was one which would be absorbed and allow the wound to heal, eliminating to a large extent these persistent sinuses and the necessity of removing the sutures later. Catgut was such a suture, and has become almost universally accepted as the ideal suture—this in spite of the well appreciated difficulty in sterilizing and the high cost. Deaths from tetanus and infected wounds have frequently been proved to be due to catgut. This has led to greater efforts to sterilize catgut effectively, but seldom to a search for a better suture material.

Halsted[1] in America, and Kocher in Europe were not satisfied with the high percentage of wound infection in so-called "clean" cases, and experimented anew with silk. Almost fifty years ago they both recorded fewer infections and more kindly wound healing by using silk sutures in place of catgut. In 1913, after many years of careful observation and experiment, Halsted published his classical paper on the uses and advantages of silk as a suture material, stating at that time, "The relatively high cost of catgut, its bulkiness, the inconvenience attending its use and sterilization, its inadequacy, the uncertainty as to the time required for its absorption, and the reaction it excites in a wound induced me to discard it completely in clean wounds in the surgery of the human subject and of the animal."

It may be taken for granted that every surgeon has as his highest aim the desire to obtain kindly wound healing. The dread of infection is ever present. Few surgeons, however, question the perfection of their technique; it is one of the things they take for granted. In how many clinics, year in and year out, have such accurate observations on wound infection been made as were reported by Meleney![2] His careful work suggests that form of genius which is the art of taking infinite pains, and this work has caused him to abandon his former faith in catgut to become a disciple of Halsted's silk technique.

With the development of aseptic surgery catgut became frequently the medium through which infection was introduced into the wound. Numerous articles have shown the impossibility of guaranteeing sterile catgut. Catgut is a foreign "protein" and therefore irritating. It has to be liquefied and absorbed by the tissues surrounding it, and this is accomplished by the response of the tissues to this irritation. This produces an exudative inflammatory reaction around a necrotic base and an irritating foreign body (the suture), creating a perfect culture medium. It has frequently been shown that healthy tissues can handle a certain amount of bacterial contamination, but in the presence of necrosis this ability is greatly limited. Such an unfavourable situation is produced when large bites of tissue are ligated (or strangulated) by heavy catgut.

Clock[3] has shown that all brands of catgut he tested, both domestic and foreign, were never uniformly sterile. He states that so-called sterilization by any method yet devised is inefficient and unreliable. Carefully controlled heat sterilization is the only reliable and positive method. His results prove conclusively that the danger of non-sterile sutures still exists, thus jeopardizing the reputation of the surgeon and hospital as well as the welfare and life of the patients.

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In addition to its irritative action and its possibly infective state catgut is unreliable as to its time of absorption and the possibility of the knots slipping. When an abdominal wound is re-opened a week or even ten days after being sutured with catgut, the catgut is found lying loose, swollen, and partly liquefied in the deeper layers, surrounded by exudate and occasionally frank pus. This is not visible on the surface when the skin is well healed. The muscle layers, however, show no strength and are readily separated with the finger. The less the surgeon has studied wound healing, the heavier the catgut he is likely to use. Frequently two layers of double No. 2 chromic catgut are used, and the final knot is tied with six strands. Such a knot takes weeks before it is finally absorbed and the site it occupied healed over. During this time a foreign body abscess is present, a perfect culture medium for any contaminating micro-organism. It must never be forgotten that aseptic surgery is aseptic in name only, almost all, if not all, operative wounds being contaminated. Dependence must be placed, therefore, on the natural ability of tissues to combat infection. The fewer the organisms, the better the chance of the tissues to combat them. The less the trauma to the tissues, the smaller the bite of ligated tissue, the more thorough the hæmostasis, and the less irritating the suture material, the fewer will be the infections and the more kindly the healing of the wound.

The recent article of Mont Reid[4] on wound healing should be read by all surgeons. He quotes Billroth, who stated, "The proper treatment of wounds is to be regarded as the most important requirement for the surgeon." Among the first principles of wound healing is the importance of preventing necrosis and débris in wounds. Healthy living cells have a great power to kill germs; dead cells are helpless against their invasion. This means constant effort to eliminate from wounds all gross necrosis, and the elimination of all germicidal tissues which can kill living cells and thereby assist the growth of germs as well as retard wound healing. This with the maintenance of adequate blood supply plus rest will help wound healing.

An endeavour has been made to show that catgut is by no means an ideal suture material, and the suggestion is offered that fine silk has advantages.

It may be that in the presence of infection an absorbable suture has advantages over the non-absorbable. These advantages, however, have never been shown in clean cases. The ideal suture material is one which can be sterilized by boiling, is uniform, of low cost, and which produces the least tissue reaction. With the possible exception of chrome steel wire, fine silk is the only such suture material. It can be sterilized by boiling, it is uniform in strength, and can be obtained in very fine grades, such as the silk always used for blood vessel suture. The greatest opponents of silk always accept the use of silk as the best material for blood vessel work. The cost is low compared with dependable catgut. Repeated experimentation has proved that it is very much less irritating to the tissues than catgut. In Halsted's laboratory alone this observation was repeatedly confirmed over many years of experimentation.

Meleney,[2] in a survey of 1,132 cases consisting of thyroids, hernias, and radical breast amputations, found 3 per cent of infections in 526 cases where silk was used. In 351 cases where catgut was used, a total of 8 per cent of infection resulted. Where combined silk and catgut were used the occurrence of infection was also 8 per cent. Vivier (quoted by Meleney) found that in similar parallel wounds, using silk in one and catgut in the other, the catgut wounds always contained more germs than those in which silk was used. Thompson[5] found that firm primary union occurred in 95 per cent of wounds sutured with silk and in only 90 per cent of similar cases sutured with catgut.

Goff[6] analyzed wound healing in 3,000 abdominal wounds, and found a marked advantage of silk over catgut, concluding, "In this series of cases the average incidence of faulty wound healing from all causes in clean abdominal wounds closed by absorbable suture material has been 12.1 per cent, while in those closed by non-absorbable sutures it has been 4.3 per cent. Actual infection was 10 per cent with catgut against 4 per cent with silk." Further, he showed that in 245 wounds thought to be contaminated at the time of operation 83.5 per cent of those closed by catgut had faulty union, while only 70 per cent of those closed by silk were so affected. This again shows the lessened likelihood of infection in potentially infected wounds by the use of silk.

Shambaugh[7] refuted the suggestion that an infected wound sutured with silk suppurates for a longer time than a corresponding one sutured with catgut. In an analysis of 2,360 cases 108 wounds were found to have healed imperfectly, 61 with minor infections and 47 with definite suppuration. A study of these infected cases showed that the use of fine silk with proper technique does not delay the average healing of wounds. Further, infected wounds may heal completely without discharging the silk sutures, but exceptionally the healing may be delayed three to four months as a direct result of the presence of silk in the wound. Further, he found the incidence of infection twice as great with catgut as compared with silk. All reports studied have shown that a careful silk technique results in only half as many infections as occur when catgut is used.

A comparison of the strength of wounds sewn with silk and those sewn with catgut again favours the former. Whipple,[8] reviewing the advantages of silk over catgut, reported his experimental results in parallel right and left paramedian incisions in rats, using silk on one side and catgut on the other. On successive days following the operation the wounds were excised, and the incision subjected to tension. Invariably those sutured with catgut were the first to part. Sections cut from respective incisions demonstrated the reason for this. Around the catgut sutures pressure necrosis was present surrounded by exudate with considerable small round-cell infiltration, showing well the marked irritation produced by the catgut; and the necrotic foci form excellent culture media for any germs that might be, and usually are, present. About the silk sutures much less inflammatory reaction was present. After the tenth day post-operatively, the catgut became absorbed but the inflammatory foci remained. In the silk wounds of similar date the fibres of the sutures became separated by infiltrating foreign-body giant cells with a minimum of or absent leucocytic invasion, the strand rapidly becoming encapsulated by fibrous connective tissue.

Plain catgut is absorbed from the fourth to the seventh day, or longer. Chromicized gut resists absorption for a longer period of time. The latter, however, is much more irritating to the tissues, the surrounding polymorphonuclear and lymphocytic infiltration being more intense, but absorption depends upon the surrounding inflammatory reaction, and is hastened by actual infection, which it so often promotes; with the absorption goes loss of tensile strength. Chromic catgut of any size has been shown to be absorbed in whole or in part in five to eight days in infected wounds, and to have lost its tensile strength in four to seven days. Thus disruption of the wound occurs on the seventh to the tenth day. The use of silk, which retains its strength, will prevent this serious complication almost entirely.

The well-known fact, mentioned previously, that necrotic tissue favours infection was shown experimentally by Halsted. Introducing cultures of *Staph. aureus* intraperitoneally in 13 dogs, none developed peritonitis. In 8 others he introduced similar amounts of *Staph. aureus* after ligating a good-sized piece of omentum. Of these 8 dogs 2 died of general peritonitis, 2 developed local abscesses, and 4 remained unaffected.

Tense sutures, and the ligating of large masses of tissue are frequent causes of tissue necrosis in wounds. A surgical technique must be developed which will eliminate these faulty results, and this technique is much more readily maintained by the use of fine silk. The reason is that a fine silk ligature is useless for large bites of tissue. Fine forceps must be used and an effort made to catch only the bleeding point. It ought usually to be possible with a slight pull on the forceps to stretch the vessel, demonstrating that no adjacent tissue has been clamped. One of us (Miller) after the use of both silk and catgut for fifteen years has demonstrated repeatedly that catgut wounds heal more slowly and are more tender and indurated than similar wounds where fine silk has been employed. Repeatedly, patients sit up in bed on the fourth day following sub-total gastrectomy with no pain whatever in their abdominal wounds.

Howes[9] demonstrated that stomach wounds in rats when sutured with silk were stronger after the third day than those sutured with catgut. Heavy catgut appeared to give no greater strength than fine catgut. The silk wounds also showed no exudation after the fifth day, while with catgut the exudative processes were active until the sixth or seventh day.

Parsons[10] recently reported the results of an investigation by Longacre of the Presbyterian Hospital of New York. Longacre reviewed the results of 702 cases of herniotomy, 244 repaired with chromic catgut and 458 with silk. In the catgut series the percentage of recurrences was almost four times that of those in the silk series. The better wound healing and lessened infection were the factors responsible for the improvement where silk was employed. The other variables, such as the operator, type of operation, and type of patient, appeared to be the same in both series.

Sufficient has been said to make surgeons realize that catgut is a much less efficient suture material than silk. In clean cases the small ligatures never cause later trouble. The silk used must, however, be fine silk. If heavy silk is used the same errors creep in which are the rule when catgut is used. Large bites of tissue ligated under tension lead to tissue necrosis. A careful operative technique must be developed based on a thorough understanding of wound healing. The best in aseptic technique must be routine. The minimum amount of tissue must be crushed in forceps and ligated, preferably the vessel alone. The finest silk possible should be used. If the occasional ligature does not break the silk is too heavy. The use of small needles, the taking of small bites of tissue, and tying firmly but not too tightly, are essentials. In early trials with silk technique the surgeon always gravitates to heavier silk, but with practice and attention to detail he soon demands the finest silk, and the use of heavy silk "hurts him more than it hurts the patient". The technique takes more patience and more time, but the improved results are more than adequate recompense.

It may be that silk will in time be displaced by chrome steel wire as the ideal suture material. Described by Babcock,[11] it has been shown by Cone and Norcross, of the Montreal Neurological Institute, to be almost non-irritating to tissue, and is used considerably by Cone in his neurological cases. Our own experience is not sufficient on which to base an opinion, but in one case following a gastric operation the wound had to be re-opened on the tenth day and it was found to be completely healed with a strong scar, the small sutures being completely encapsulated. Only with difficulty could the wound be re-opened. This is a finding we have never observed in re-opening a wound sutured with catgut. The wire is much more difficult to handle than silk, the knots being more difficult to tie and the wire tending to kink, which makes it catch in the tissue. It is essential to cut the wire at the knot as otherwise the ends irritate the skin. In one case we had to remove them on this account. Chrome wire is being largely used in the Royal Victoria Hospital to replace silver wire in orthopædic and fracture cases.

Cone and Norcross have made identical sections through tissue sutured with heavy and fine chrome steel wire, silver wire, fine silk, and No. 0 catgut. A section of muscle was tied with these different ligatures in the quadriceps femoris of a monkey. On the thirteenth day the animal was killed and sections prepared to show the tissue reaction to each material. The steel wire showed marked fibroblastic organization with little exudative reaction; the silk showed more exudative reaction; and the fine catgut showed the most marked exudative inflammatory reaction.

Theoretically, then, it would appear that chrome steel wire produces the least inflammatory (exudative) reaction, and the most fibroblastic reaction, and from this point of view is perhaps the ideal suture material. In practice silk is quite satisfactory, cheap, easier to handle than wire, produces little exudative reaction, and an early strong fibrosis. It lies in the tissues without causing later annoyance. It can be sterilized by heat. The use of fine silk leads to a more careful, more gentle, surgical technique, helping the surgeon to obey the laws which favour kindly wound healing. Infection following its use is half that following the use of catgut. It is important to remember that in infected cases silk may cause sinuses which persist until it is removed. For this reason we use catgut routinely in the presence of infection.

SUMMARY

A plea is offered for a more extensive use of fine silk as a suture material in clean cases. Its use will lessen infection, give earlier and greater strength of wound, with lessened danger of immediate and late herniation. Its use in hernial repair will halve the percentage of recurrence. In our personal experience its use lessens the duration of hospitalization. The advantages of fine chrome steel wire are men-

tioned, but the use of silk is advocated as the ideal routine suture material in clean cases.

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PRURITUS GINGIVÆ

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PRURITUS has been described as a symptom in various disorders. The term designates "itchiness", and this may be present in many locations, the most common being the anus, vulva, head, arms, legs, and between the fingers and toes. A search of the literature fails to record itchiness in the gums. This report is designed to describe several cases in which this symptom was significant, and the term "pruritus gingivæ" was coined in this connection.

This report is limited to 5 cases. In 4 of them sugar was found in the urine, and blood examination revealed a delayed sugar tolerance. With these findings as a basis, one might suspect this symptom when associated with other criteria in the diagnosis of diabetes.

CASE 1

A male, aged 42, French Canadian, married, complained of itchiness in his gums. Abscesses on his nose and ears were also noted. The physician in charge attempted treatment of these abscesses by medication but without success. Oral prophylactic treatment did not prevent the itchiness in the gums. The patient was referred to me for diagnosis and treatment. He was subjected to the routine physical examination of the mouth, including a complete set of oral radiographs. His daily diet was recorded for seven days. A nasopharyngeal smear and a stool were cultured aerobically and anaerobically, the former on a blood plate and the latter on a MacConkey plate for possible lactose-negative organisms. The urine was examined for albumin and sugar.

The results of the various examinations were as follows. Oral cavity.—Teeth, gums, tongue, cheeks, tonsils, floor of the mouth, roof, essentially negative, except for itchiness in the gums. X-ray of the teeth was negative. Diet.—A rather high intake of carbohydrates and fats was noted. Nasopharyngeal culture. —*S. viridans*, staphylococci, pneumococci, and an occasional colony of hæmolytic streptococci, but too few to be of any significance. Stool gave *B. coli*. The urine was negative for albumin; sugar, 2 plus.

As a result of these findings the patient was prescribed a diabetic diet. The itchiness in the gums disappeared within a few days and the abscesses on his nose and ears cleared up. Six months after this dietary regimen was instituted the itchiness and abscesses had failed to recur.

CASE 2

A female, aged 33, Jewish, married, complained of itchiness in the gums, also between the fingers of her right hand. The positive findings in routine examination revealed sugar in her urine and a delayed tolerance of the blood sugar. A diabetic diet prevented both these symptoms from recurring after a period of five months.

CASE 3

A male, aged 35, Jewish, married, complained of itchiness in the gums after strenuous exercise, and, with irregular periodicity, pruritus over the right clavicle. The only positive finding was a delayed sugar tolerance, and a diabetic diet cleared up both these symptoms within a few days and did not recur since then. The patient was last seen seven months ago.

CASE 4

A female, aged 58, married, complained of itchiness in the gums, also an ulcer on the forehead which would not heal. This ulcer was caused accidentally in a beauty parlour while having her hair waved. Blood sugar tolerance and urine analysis revealed a somewhat advanced case of diabetes. A diabetic dietary regimen was instituted, and protamine insulin prescribed. The gums and ulcer have cleared up, and symptoms have not recurred in the past five months.

CASE 5

A female, aged 35, Jewish, married, complained of occasional pruritus gingivæ with a rash on her lips. The routine examination was essentially negative. The blood sugar was well within the normal range and the urine was free from albumin and sugar. Careful questioning elicited the information that symptoms appeared only after the use of a certain popular brand of tooth paste. The patient was instructed to change to another paste and the symptoms failed to recur after one year.

This case is offered primarily to show the difference in etiology between case 5 and the other four cases, also to stress the importance of the differentiation between allergic manifestations of drug idiosyncrasy and those due to a disturbed sugar metabolism.

In this report certain facts stand out rather prominently.

1. The importance of an adequate oral examination particularly in respect to systemic disease.

2. Pruritus gingivæ is probably more prevalent than we are aware of, and should be looked for in routine oral examination.

3. Pruritus gingivæ, though strongly suggestive of disturbed sugar metabolism, must be differentiated from drug idiosyncrasy in the absence of infection in the oral tissues.

4. Three of the five patients were of Jewish extraction.

REPORT OF TWO CASES OF POSITIVE WASSERMANN REACTION IN THE ASCITIC FLUID

BY NORMAN B. GWYN, M.B.

Toronto

POSITIVE Wassermann reactions in ascitic fluid are probably always related closely to syphilis of the liver of the gummatous type. The behaviour of the ascitic fluid is much like that of the cerebrospinal fluid, in that positive reactions may persist in the fluid long after treatment or time has rendered the blood Wassermann-free, and, as in certain doubtful cases of cerebrospinal disease, a positive Wassermann test in the cerebrospinal fluid may explain the doubtful symptoms, so it has been found in many cases with hepatic enlargement and ascites that the serological results have given the clue to what has seemed to be an obscure disorder.

One's first impression on finding positive reactions in the ascitic fluid is that probably some chemical constituent of the exudate may be responsible for the striking serological findings, rather than that the report means syphilis of the abdominal cavity or liver. Perusals of the various textbooks dealing with the Wassermann reactions,[1, 2] however, show that those most interested in the subject consider a positive Wassermann reaction in the ascitic fluid to mean syphilitic infection, and one can refer to a number of reports already in which this interesting finding is taken as indicating that syphilis of the liver exists. The majority of the syphilologists are unanimous in insisting that in no cases of ascites should one omit to test the ascitic fluid for the Wassermann reaction.

Whether positive Wassermann reactions in ascitic fluid mean that a gumma of the liver is in direct communication with the abdominal cavity or not can hardly be said. The great probability, however, is that in all massive gummata of the liver, secretion from the gumma itself must find its way into the abdominal cavity. One notes that positive Wassermann reactions have been obtained in the secretions from chancres and from pleural and joint exudates.

The two cases which we are detailing showed in addition to the outspoken hepatic symptoms symptoms referable to spinal disease and injury. In the first of them a spondylitis of the cervical and dorsal vertebræ had resulted in very pronounced symptoms and physical signs of nerve root pressure in the hands and arms. In the second a severe trauma of the upper dorsal and cervical vertebræ had produced signs of cord damage with extreme wasting and loss of power in the hands and arms. In the course of the examinations to which the patients were subjected lumbar puncture was done and cerebrospinal fluid, negative as concerns any suspicion of syphilis, was recorded. There was a gradual improvement, with lessening of pain and regaining of power in the first case, while in the second case a paralysis of the muscles of the hands has persisted.

CASE 1

Mr. R. seen with Dr. MacDonald, of Toronto, was a man aged 58 years. He had been a hard worker all his life and a steady consumer of alcohol. He gave the history of very persistent pain in the neck, running down both arms and with this pain considerable loss of power. It had been considered some years previously that a tumour of the spinal cord might exist, but when he came before me the thickening of the small joints of the hands and the very evident changes in the cervical and dorsal spine seemed to make the diagnosis of spondylitis and arthritis very certain. There were no tophi, though the possibility of gout had been entertained. He remembered having had a venereal infection when a young boy, but his blood Wassermann test had been persistently negative. He had been a very heavy smoker and it had been known that for many years he had had considerable elevation of his blood pressure, the figures being 160/120. Other than the arthritic symptoms nothing was complained of for about four years, when

he appeared before me complaining of hæmatemesis, of swelling of the abdomen, loss of appetite, with morning vomiting and very distinct loss of strength. He had further noted that from time to time there were waves of fever lasting for five days at a time.

Under observation, fluid accumulated rapidly in the abdomen; his legs began to swell, a very typical hepatic facies presented itself, and after a necessary aspiration of the ascitic fluid the spleen could be felt and the liver was noted to be large, hard and nodular. There was a slight yellowish tint to the body and eyes; the blood serum was distinctly yellowish, with the icteric index distinctly raised, and an indirect positive van den Bergh reaction was present. The fluid removed from the abdomen was of a clear straw colour. No suspicious cells were noted and no tuberculosis developed after the inoculation of the fluid precipitated into a guinea pig.

At the time of the second aspiration of the abdomen a few weeks subsequent to the first, a large amount of fluid was removed, and again after the removal of the fluid the much enlarged liver and spleen were easily felt. A friction rub developed over the prominent right lobe of the liver and in a short time was generalized over most of the liver area. Little by little this friction spread upwards into the chest, and in about a month could be heard over the lower two-thirds of the right lung. Signs of fluid in the chest were noted at about this time, but there was never enough fluid collection in the chest to obliterate the well marked pleural rub, and at most of the examinations at this time a loud friction could be heard from the lower border of the liver up to the middle of the right scapula. The report from the second specimen of ascitic fluid was returned to us with "Wassermann positive, 4 plus", and, with the clinical signs before one, it was felt that a large gumma of the liver had possibly pushed through the diaphragm up into the pleural cavity. Pictures showed nothing but dense shadows involving the lower two-thirds of the right chest.

With the Wassermann report so strongly positive immediate treatment with mercury and iodine was instituted, and one was gratified to see almost immediate improvement. One further aspiration was necessary, and again the report of "Wassermann 4 plus" was returned in connection with the fluid. The fever waves which had been most persistent now disappeared, as did the swelling of the legs, and after a fourth aspiration, still positive for the Wassermann reaction there was no further accumulation of fluid in the abdomen. The friction rub disappeared from the chest and in short order all signs of pleural involvement disappeared. The last note said "There is no sign of venous engorgement; liver is distinctly smaller; spleen can be felt; the appetite is returning and though he is very weak and thin he is better in every way. There is no vomiting, and though in the early part of his illness he had had an active hæmatemesis there has been no recurrence of this symptom and he has improved to the extent of being able to get back to his work." Instructions had been given that he was on no account to have intravenous medication, but unfortunately falling into the hands of an over-enthusiastic physician this form of medication was urged, and I was informed that after the third or fourth injection an acute illness developed and the patient died.

CASE 2

Seen with Dr. Van Wart, of Fredericton, N.B., to whom I am indebted for the privilege of reporting it. Mr. C., aged 30, was admitted to the Fredericton Hospital with the history of having had a severe crush of the chest and of the upper part of his spine. There was fluid in the chest immediately after the accident, and little by little the small muscles of the hands began to waste and lose their power. The patient complained persistently of some soreness in the neck, and with this symptom, and with the wasting of the hand muscles, damage to the spinal cord was thought of. Nothing, however, was found on lumbar puncture to suggest an inflammatory or other condition affecting the cord. An x-ray of the bones of the neck showed a very marked osteoarthritic condition rather than a fracture, though it is possible that both conditions existed. After some four or five months subsequent to the accident fluid began to accumulate in the abdomen and he developed œdema of the legs. There were no other signs of symptoms suggestive of a cirrhosis of the liver. There was no jaudice, no distension of the veins of the abdomen, no suggestion in his facial appearance of alcoholism or of a progressive condition in the liver. It was noted that his left pupil was smaller than the right but he insisted that this variation had existed since birth.

Although there was no history of venereal disease the question of syphilis of the liver was thought of, even in the absence of a palpable liver and spleen. It was also felt that one must consider the possibility of thrombosis of the portal vein as a result of his accident, and finally consideration was given to the possibility of tuberculosis or malignant disease of the peritoneum.

For weeks very little change was noticed in the man's condition. He looked fairly well. There was no evident anæmia. The abdomen was abnormally distended and the legs swollen. There was no jaundice. The van den Bergh reaction was returned as being persistently of normal range, and eventually when the abdomen was emptied of fluid only a very slight enlargement of the liver and spleen could be made out.

With the recollection of Case 1 in one's mind it was suggested that the Wassermann test on the ascitic fluid should be done at the time of the next aspiration. This was seen to and the report came back, "Wassermann positive 4 plus". The blood in this case also showed a positive reaction, and one was interested in hearing a few weeks later that rapid improvement took place with the use of mercury and iodine; the ascites and œdema of the legs completely disappeared, though, as might be expected, but little change could be noted as concerned the impaired power of his hand muscles.

This short report of two most interesting cases indicates clearly that no examination of ascitic fluid can be considered complete unless a report upon the Wassermann reaction of the exudate is included. In Case 1 the clinical findings suggest that a massive gumma was pushing upwards into the chest. In Case 2 the actual signs of liver involvement were never so clear, and the ascites and œdema of the legs were all of distinctly obscure origin. In Case 1, again, the dangers associated with intravenous injections of arsenic in cases of hepatic syphilis are certainly suggested, for the patient had been progressing favourably under the simpler treatment of mercury rubs and iodine by mouth. Such dangers have often been pointed out by those interested in the question of hepatic syphilis. Both cases are of interest in that they were complicated with spinal lesions, lesions not usually associated, however, with cerebrospinal

syphilis, and the results of lumbar puncture seem to indicate that cerebrospinal syphilis did not exist.

One might conclude by saying that all who write authoritatively on the question of Wassermann reactions say that such reactions in ascitic fluid indicate the presence of syphilis, and that no ascitic fluid should be disposed of without the possibility having been taken into consideration that syphilis of the liver is responsible for the collection of fluid in the abdomen.

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PNEUMOCOCCUS TYPING IN THE PUBLIC HEALTH LABORATORY

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Toronto

IT has been shown that in order to obtain satisfactory results in the serum treatment of pneumonia the early administration of the homologous antipneumococcus serum is essential. Therefore, in a given case of pneumonia, a rapid diagnosis of the exact type is needed. In the Neufeld test we have such a diagnostic aid.

In this communication we wish to report on the results of pneumococcus typing on over 1,000 separate individuals. These tests were carried out on sputa and pathological fluids submitted by private practitioners from Toronto and rural areas as far distant as 200 miles from Toronto. Of the specimens received 40 per cent were from Toronto and the remainder rural in origin. The typing was done at the Central Laboratory of the Department of Health of the Province of Ontario.

Method of typing.—The sputum or other fluid suspected of containing pneumococci is typed directly by the Neufeld method against rabbit sera prepared from all the pneumococcic types of Cooper. If one cannot demonstrate any swollen capsules by this direct method, a mouse is inoculated intraperitoneally with some of the specimen. Four hours later a peritoneal puncture is done with a capillary pipette containing some normal saline, and some peritoneal washings are obtained. These washings are again examined by the Neufeld method. We speak of this examination as the indirect Neufeld test. In the majority of instances if a pneumococcus has not been found directly it will be found after four hours. Occasionally there is a pneumococcus present which will not type. In such a case it is necessary to get the organism from the heart blood of the mouse and identify it by its biological characteristics. We call these organisms pneumococci (type undetermined). If a pneumococcus is isolated from culture and it is not pathogenic for a mouse an agglutination test is done to determine the type. None of these avirulent types are included in this series. All specimens which contain pneumococci, other than Types I and II, are injected into mice to determine whether or not this is the only type present. When Gram-positive diplococci are found in a spinal or pleural fluid a direct Neufeld test is carried out.

In order to obtain more definite information regarding the various types a questionnaire has been prepared, which is sent to the doctor eight weeks or more after the typing has been done. This period was chosen in order to determine as far as possible the outcome of the disease in the patient. The physicians have made a very satisfactory response. Of 700 queries sent out 567 have been returned. In some instances it was difficult for the physician to follow the patient for this length of time.

Incidence of pneumococcic types in various specimens.—Between 1,200 and 1,300 typings have been done, but a number of these were repeat tests on the same individual. In Table I the results of typing on 1,003 persons are shown. In 15 instances there were more than one type in the sputum of the same person. In Table I only that type which was most prevalent in the sputum is included as the causative organism of the infection.

There were 584 sputa and pneumococci were found in 322, of which 87 (27 per cent) were Type I, 27 (7 per cent) were Type II, and 77 (20 per cent) were Type III. Of 126 pleural fluids 70 per cent were Type I and II. There

were 14 cases of pneumococcic meningitis which were distributed over various types.

TABLE I.

PNEUMOCOCCUS TYPING

Incidence of pneumococcus types in various types of specimens

Type	*Sputa*	*Pleural fluid*	*Spinal fluid*	*Total*
I	87	81	1	
II	21	8	1	
III	77	6	2	
IV	24	4	1	
V	33	7	2	
VI	32	2	..	
VII	35	1	1	
VIII	41	2	2	
IX	10	..	..	
X	14	..	..	
XI	7	..	..	
XII	23	3	..	
XIII	10	..	..	
XIV	4	1	..	
XV	12	1	..	
XVI	1	..	..	
XVII	16	1	1	
XVIII	9	..	..	
XIX	17	3	1	
XX	13	1	..	
XXI	5	..	..	
XXII	10	1	1	
XXIII	11	..	..	
XXIV	8	..	1	
XXV	2	..	..	
XXVII	4	..	..	
XXVIII	9	1	..	
XXIX	8	1	..	
XXXI	11	..	..	
XXXII	1	..	..	
Pneumococci (unclassified)	29	2	..	
Hæm. Strep.	60	..	..	
Friedländer	4	..	..	
No pneumococci	198	..	..	
	846	126	14	986
Peritoneal fluid, Type I, 1; Type XIII, 1; eye, Type VI, 1; pericardial fluid, Type I, 1; ear and mastoid, Type I, 1; Type III, 6; Type V, 2; Type XXII, 1; antrum, Type VIII, 1; stool, Type XIX, 1; blood, Type V, 1.				17
			Total.....	1,003

TABLE II.

PNEUMOCOCCUS TYPING

Urban and rural distribution of the pneumococcic types in sputa by the direct Neufeld and the indirect Neufeld method

Type	*Direct*		*Indirect*		*Total*
	Toronto	*Rural*	*Toronto*	*Rural*	
I	12	15	3	5	35
II	..	4	..	7	11
III - XXXII	46	52	55	70	223
	58	71	58	82	269

Direct and indirect Neufeld test.—The indirect method includes those tests where a mouse inoculation was required with a Neufeld examination after four hours or longer. We note that in 80 per cent of the pneumonias due to Type I, the organisms were found directly. There was very little difference whether they were from Toronto or from rural districts. In the Types III–XXXII the type was found directly in only 50 per cent of the cases.

DATA FROM QUESTIONNAIRE

TABLE III.

PNEUMOCOCCUS TYPING

SPUTA

Cases and deaths from pneumonia for each type of pneumococcus by sex and cases in which pneumococcus was isolated but no pneumonia was present.

Type	*Pneumonia*				*Not pneumonia*	
	Cases		*Deaths*			
	Male	*Female*	*Male*	*Female*	*Male*	*Female*
I	29	20	4	1	..	..
II	12	1	..	..	..	..
III	19	17	2	1	2	2
IV	9	4	1	..	1	2
V	7	11	1	2	..	..
VI	7	8	..	2	4	3
VII	8	2	3	..	2	1
VIII	12	7	..	1	2	2
IX	3	3	1	2	2	..
X	5	3	..	..	2	..
XI	1	1	..	..	1	..
XII	5	5	..	..	1	2
XIII	5	1	..	..	1	..
XIV	1	2	..	..	..	1
XV	5	3	..	..	2	1
XVII	4	2	..	..	2	..
XVIII	1	..	..	..	..	1
XIX	4	7	..	..	..	2
XX	4	3	1	..	..	1
XXI	2	1	..	..	1	..
XXII	3	2	2	1	..	..
XXIII	2	1	..	..	3	1
XXIV	3	2	..	..	..	1
XXV	3	..	..	..	..	..
XXVII	4	..	..	..	1	..
XXVIII	6	2	2	..	..	2
XXIX	3	2	..	..	1	1
XXXI	2	7	1	..	..	1
Group IV	9	11	1	..	2	2
	178	128	19	10	30	26

Incidence of types and mortality.—Of the 567 specimens about which answers were received there were 362 sputa. Among these there were 306 cases of pneumonia from which the pneumococcus was isolated, with 9.5 per cent of deaths. Sixty-five per cent of these deaths were in males. Fifty-six patients in whom pneumococci were isolated did not have a pneumonia. In no in-

stance was a Type I or Type II found where there was no pneumonia.

The 29 deaths were distributed in 13 different types as follows:

Type I.

1. Manager, aged 34, with both lungs involved, died after 4 days with pleurisy and hiccoughs. Temperature was over 105° F.
2. Teamster, aged 54, died of toxæmia.
3. Farmer, aged 50, died in 3 weeks of toxic myocarditis.
4. Man, aged 72, died in 4 days of toxæmia.
5. Labourer, aged 52, had extreme toxæmia. He was not given serum because he was subject to asthmatic attacks.

Type III.

6. Farmer, aged 59, died in 7 days of toxic myocarditis. He was given mixed Type I and II serum without any good effect.
7. Caretaker, aged 69, died in 6 days of toxæmia.
8. Housewife, aged 54, died suddenly in 7 days of embolism.

Type IV.

9. Mechanic, aged 48, died in 19 days of toxic myocarditis.

Type V.

10. Boiler maker, aged 70, developed a bronchopneumonia after an operation for a perforated duodenal ulcer.
11. Domestic, aged 21, had an extensive envolvement of both lungs and developed nephritis and myocarditis; death in 14 days.
12. Housewife, aged 49, died of auricular fibrillation in 11 days.

Type VI.

13. Housewife, aged 50. She had a crisis and then several relapses, died after 2 months.
14. Housewife, aged 44, had syphilitic myocarditis and aortitis. She died 21 days after the onset of the pneumonia.

Type VII.

15. Hospital attendant, aged 54, died in 4 days from toxæmia. He had had a previous attack 9 months earlier.
16. Man, aged 69, had diabetes and gangrene. He developed a pneumonia and died in 6 days.
17. Farmer, died one month after the onset. He had pulmonary œdema.

Type VIII.

18. Spinster, aged 66, died in 7 days after the onset of the pneumonia, and the disease terminated as a meningitis. Blood in the sputum was marked.

Type IX.

19. Housewife, aged 34, died in 12 days of a bronchopneumonia.
20. Housewife, aged 40, died of pneumonia following labour.
21. Male died of pneumonia.

Type XX.

22. Garageman, aged 50, died in 10 days. Both lungs were involved.

Type XXII.

23. Housewife, aged 76, died of bronchopneumonia in 28 days. She had a senile dementia.
24. Textile worker, aged 57, died of bronchopneumonia in 45 days. He had an empyema and died of a toxic myocarditis.
25. Milk vendor, aged 58, had both lungs involved. He died in one week of embolism.

Type XXVIII.

26. Farmer, aged 52, died in 17 days. Both lungs were involved and he had a toxic myocarditis.
27. Transient, aged 43, had an empyema on both sides and died after 90 days.

Type XXXI.

28. Labourer, aged 48, died in 3 days of a bronchopneumonia. He had an acute mitral endocarditis.

Group IV (undetermined).

29. Contractor, aged 52, developed a pneumonia after a perforated duodenal ulcer and died over 3 months later.

It is to be noted that a large number of these deaths were in the older age groups. The commonest cause of death as recorded by the physician was a toxic myocarditis.

Table IV.

Pneumococcus Typing

Sputa

Physicians' diagnosis of cases in which pneumococcus was isolated but no pneumonia was present.

Type	*Bronchitis*	*Bronchiectasis*	*Sinus infection*	*Pulmonary hæmorrhage*	*Tuberculosis*	*Miscellaneous*
III			2mm			Normal–1f Pyelitis–1f
IV				1f	2mm	
VI	1m	1f	4fffm		1f	
VII	1m				1f	Acute nephritis –1m
VIII	1m		1f	1f		Gunshot wound in lung–1m
IX	1m	1m				
X	1m		1m			
XI	1m					
XII	1m					Pleurisy–1f Silicosis–1m
XIII				1m		
XIV	1f					
XV	1f	1m			1m	
XVII					1m	Normal–1m
XVIII	1f					
XIX					2ff	
XX	1f					
XXI	1m					
XXIII	1m	1f	2mm			
XXIV	1m					
XXVII	1m					
XXVIII	1f		1f			
XXIX	1m					Normal–1f
XXXI					1f	
Group IV	3ffm					Lung abscess–1m
	20	4	11	3	9	9

m–male f–female

Diagnosis of cases where there was no pneumonia present.—There were 56 cases in which the pneumococcus was isolated but there was no pneumonia present. In 20 of these there was a diagnosis of bronchitis. The majority of these

cases started like a pneumonia but there was no evidence of consolidation and they recovered rapidly. In 35 cases altogether there was an upper respiratory infection. Nine persons had tuberculosis. A number of these showed signs of an upper respiratory infection when the specimen was taken. In 3 cases of pulmonary hæmorrhage a pneumococcus was found but no tubercle bacilli were found on culture.

TABLE V.

PNEUMOCOCCUS TYPING

PLEURAL PUS

Number of cases and deaths of empyema following pneumonia showing type and sex of patient

Type	Cases		Deaths	
	Male	Female	Male	Female
I	43	14	4	1
II	6	..	2	..
III	3	1	..	..
IV	1	..	..	..
V	2	1	..	..
VI	2	1	1	..
VII	1	..	1	..
VIII	1	2	..	..
XII	1	..	..	..
XV	..	1	..	..
XVII	1	..	1	..
XIX	1	..	..	..
XX	..	1	..	1
XXII	1	..	1	..
XXVIII	2	..	1	..
Group IV	2	..	..	..
	67	21	11	2
	88		13	

Incidence of types and mortality in empyema.—Of 88 cases of empyema due to the pneumococcus 57 (65 per cent) were in Type I, but there were only 39 per cent of the deaths in this type. Seventy-six per cent of the cases and 85 per cent of the deaths were in males. The 13 deaths following empyema were in 8 types as follows.

Type I.

1. Male, aged 18 months, had an empyema with an otitis media. He died in 3 weeks after the onset.
2. Superintendent, aged 48, also had a pericarditis. Four pockets of pus were found in right pleural cavity at autopsy. He died in 35 days.
3. Male, aged 7, died in 3 weeks from the toxæmia of the empyema.
4. Male, aged 2, died after 5 weeks of toxæmia.
5. Female, factory hand, aged 40, died after 2 months. She developed a catarrhal jaundice.

Type II.

6. Farmer, aged 19, had a bronchopneumonia following measles, scarlet fever and rheumatic fever. Died after 60 days.
7. Transient, aged 43, died after 90 days of toxæmia.

Type VI.

8. Male, aged 6, died in 9 days after the empyema was discovered. He also developed an acute nephritis.

Type VII.

9. Farmer, aged 67, died in 14 days with an empyema and a meningitis.

Type XVII.

10. Farmer, aged 57, died in 5 weeks after the empyema was drained.

Type XX.

11. Housewife, aged 39, had bronchopneumonia, empyema and pericarditis.

Type XXII.

12. Textile worker died in 45 days of toxic myocarditis.

Type XXVIII.

13. Transient, aged 43, died after 90 days.

TABLE VI.

PNEUMOCOCCUS TYPING

SPUTA

Incidence and percentage of Type I, Type II, and Type III-XXXII by age-groups in 306 cases of pneumonia.

Age-Group	Type I		Type II		Type III-XXXII	
	No.	Percentage	No.	Percentage	No.	Percentage
0 - 4	2	4.1	..	....	2	0.8
5 - 9	5	10.2	..	....	5	2.1
10 - 19	9	18.4	1	7.7	19	7.8
20 - 29	6	12.3	5	38.4	49	20.1
30 - 39	8	16.3	2	15.4	46	18.8
40 - 49	8	16.3	1	7.7	33	13.5
50 - 59	8	16.3	1	7.7	34	13.9
60 - 69	..	....	2	15.4	23	9.4
70 -	1	2.0	1	7.7	17	7.0
Unknown	2	4.1	..	....	16	6.6
	49		13		244	

Types and percentage by age-groups in 306 cases of pneumonia.—In Table VI are shown 306 cases of pneumonia in which pneumococci were found in the sputum. They are divided by age groups into Type I, Type II, and Types III-XXXII. The number in the age groups 0-9 years should be much larger, but, in the majority of instances, children do not have any sputum. As a result a specimen was not sent to the laboratory. It is advisable to take laryngeal swabs of children suspected of having a pneumonia, and submitting these swabs to the laboratory as soon as possible. Pneumococci can be isolated in many cases by this method. Although such cases were not included in this series. 35 per cent of the Type I cases were under 20 years of age. The cases in Type II and Types III-XXXII were more prevalent in the middle age groups.

TABLE VII.

PNEUMOCOCCUS TYPING

PLEURAL PUS

Incidence and percentage of Type I, Type II, and Type III-XXXII by age-groups in 88 cases of empyema following pneumonia.

Age-Group	Type I		Type II		Type III-XXXII	
	No.	Percentage	No.	Percentage	No.	Percentage
0 - 4	13	22.8	..	....	4	16.0
5 - 9	14	24.6	..	....	2	8.0
10 - 19	10	17.6	1	16.6	1	4.0
20 - 29	8	14.0	1	16.6	3	12.0
30 - 39	2	3.6	1	16.6	5	20.0
40 - 49	4	7.0	2	33.6	1	4.0
50 - 59	3	5.2	1	16.6	4	16.0
60 - 69	..	....	..	....	4	16.0
Unknown	3	5.2	..	....	1	4.0
	57		6		25	

Types and percentage by age-groups in 88 pneumococcic empyemas.—Forty-seven per cent of Type I cases were in children under 10 years of age. In contrast to this, about 75 per cent of the Group IV, pneumococcic empyemas, were in persons over 10 years of age. One would conclude that either children are more susceptible than adults to Type I pneumococci gaining entrance to the pleural cavity and producing an empyema, or there are a large number of children with Type I pneumonia and an empyema rate similar to that of adults.

TABLE VIII.

PNEUMOCOCCUS TYPING

Incidence of herpes labialis, delirium and complications including deaths in 306 cases of pneumonia.

		Type I-II		Type III-XXXII	
		No.	Percentage	No.	Percentage
Herpes	Positive	25	40.0	66	27.0
	Negative	27	43.5	128	52.5
	Unknown	10	16.5	50	20.5
		62		244	
Delirium	Positive	31	50.0	75	30.8
	Negative	24	39.0	124	50.8
	Unknown	7	11.0	45	18.4
		62		244	
Complications	Positive	25	40.0	76	31.1
	Negative	30	48.0	114	46.7
	Unknown	7	12.0	54	22.2
		62		244	

Incidence of herpes, delirium, and complications including deaths in 306 cases of pneumonia.—Approximately 50 per cent of the Type I and II pneumonias had herpes labialis, while 35 per cent of the other Types showed this lesion. About 55 per cent of the cases of Type I and II showed delirium and 35 per cent of the Group IV cases. Complications were 45 per cent in Type I and II, and 40 per cent in the other types.

The complications in the various types may be summarized as follows.

Type I.—Empyema, 4; pleurisy, 1; myocarditis, 1; fibrillation of the heart, 1; arthritis, 1; recurrence, 1; pulmonary abscess, 1; slow resolution, 4; deaths, 5.

Type II.—Empyema, 2; pleurisy, 1; recurrence, 2; slow resolution, 1.

Type III.—Empyema, 4; pleurisy, 2; enlarged heart, 1; slow resolution, 3; deaths, 3.

Type IV.—Bronchiectasis, 1; arthritis, 1; slow resolution, 1; death, 1.

Type V.—Empyema, 2; otitis media, 1; slow resolution, 1; deaths, 3.

Type VI.—Empyema, 1; pleurisy, 2; myocarditis, 1; lung abscess, 1; deaths, 2.

Type VII.—Deaths, 3.

Type VIII.—Pleurisy, 1; otitis media, 1; slow resolution, 2; death, 1.

Type IX.—Deaths, 3.

Type X.—Slow resolution, 1.

Type XI.—Slow resolution, 2.

Type XII.—Intercostal neuralgia, 1.

Type XIII.—Lung abscess, 1.

Type XIV.—Lung abscess, 1.

Type XV.—Pleural effusion, 1; nephritis, 1.

Type XVII.—Slow resolution, 1.

Type XVIII.—Frontal sinusitis, 1.

Type XIX.—Slow resolution, 1.

Type XX.—Slow resolution, 2; death, 1.

Type XXII.—Otitis media, 1; deaths, 3.

Type XXIV.—Pleurisy, 1.

Type XXV.—Slow resolution, 1; toxic myocarditis, 1.

Type XXVIII.—Slow resolution, 2; deaths, 2.

Type XXIX.—Frontal sinusitis, 1; slow resolution, 1.

Type XXXI.—Mitral regurgitation, 1; slow resolution, 1; deaths, 1.

Undetermined types.—Empyema, 1; nephritis, 1; tachycardia, 1; slow resolution, 1; death, 1.

Most of the empyemas were in Types I, II, III, and V. Among the Group IV cases there were quite a number who showed a slow resolution of the lung. These persons were ill from 5 to 8 weeks and the lung cleared very slowly.

Pneumococcic meningitis.—Replies have been received concerning 9 spinal fluids which showed the presence of pneumococci.

Type I.

1. Farmer, aged 30. A meningitis followed an ear condition; pneumonia was not present. The ear condition existed for 30 days before the meningitis developed. The patient died in 2 days.

Type III.

2. Domestic, aged 65, died of meningitis following a mastoid operation. She had nursed a fatal case of pneumonia 3 months before she developed this ear condition.

3. Housewife, aged 42. Her sickness commenced as a bronchitis and intense nasopharyngitis which developed into a pneumonia. There was herpes labialis and an acute nephritis. She died in 7 days and had a terminal meningitis.

Type IV.

4. Male, aged 50, died of a meningitis following a sinus infection.

Type V.

5. Male, aged 42, had a bilateral pneumonia which came on suddenly. He died in 4 days of a meningitis.

Type VII.

6. Farmer, aged 67, developed a meningitis following a pneumonia and an empyema. He died in 14 days.

Type VIII.

7. Housewife, aged 31. The meningitis occurred following a pneumonia which developed in the puerperium. The patient had influenza 2 weeks previous to confinement. She died 24 hours after the onset of the meningeal symptoms.

Type XVII.

8. Farmer, aged 53. He had both lungs involved with a very acute pneumonia. Herpes labialis was present. He lived for 10 days and died 4 days after the onset of the meningitis.

Type XXII.

9. Shoe factory operator, aged 22. There was no pneumonia but the meningitis came on with a severe headache and drowsiness. He died in 5 days.

Three of these cases were due to an infection of some of the sinuses, and there were 6 which followed a definite pneumonia.

Serum treatment. — The following Type I cases were treated with serum.

1. Male, aged 29, had a lobar pneumonia in the left lung and was given 100,000 units of antiserum. The disease cleared up in 7 days.

2. Male, aged 41, had a bronchopneumonia in both lungs. He was deeply cyanosed, with tachycardia and toxic myocarditis; 80,000 units of serum were given. The patient recovered but was ill for 2 months with the heart complication.

3. Female, aged 35, had a lobar pneumonia and a crisis after 7 days. She then had a recurrence with a further extension and consolidation in the lungs. She was then given serum and in 2 days the temperature was normal.

4. Male, aged 54, was taken suddenly ill with a pneumonia and died in 4 days. He was given some serum on the second day but no information was given as to how much or what effect it had had on the patient.

5. Labourer, aged 46, had a pneumonia of the right lower lobe. He was given 120,000 units of serum in three injections within 12 hours. It was given on the sixth day. The patient was very ill but there was marked improvement 10 hours after the last injection.

6. Jail guard, aged 34, had a moderately severe pneumonia and was given 20 c.c. of serum in 16 hours and the pneumonia resolved rapidly.

7. Farmer, aged 26, had one lung consolidated with a temperature of 104° F. He was given 60,000 units of serum and recovered.

8. Nurse, aged 19, was given 4 intravenous injections of serum within 24 hours. She was ill for 5 days.

9. Student, aged 12, had a temperature of 105° F. with one lung involved. He was given serum and the temperature dropped to 97° F. within 6 hours after the serum was given and remained normal.

10. Student, aged 22, was given an initial small dose of serum but he had a severe thermal reaction and no more serum was given. He was ill for one month.

11. Station agent, aged 38, one lung involved and a temperature of 104° F. After serum treatment the temperature dropped to 99° F. and remained at this level for one week with a gradual recovery.

12. Housewife, aged 36, had a temperature of 107° F. Patient was delirious. One lung was consolidated. Serum was given on the fourth day. After 10,000 units the temperature rose to 108°F. in one hour but after 10 hours was 101° F. She was then given 20,000 units and in 8 hours the temperature was 99° F. and she made a rapid recovery.

13. Factory hand, aged 24, was given 50,000 units. Temperature was 104.5° F. with one lung involved. After the serum was given the temperature fell to 100° F. and remained at this level for one week when it became normal.

14. Farmer, aged 39, had a temperature of 104° F. with one lung involved. He was given 10,000 units of serum. Within 12 hours the temperature fell to normal and remained normal thereafter.

The following Type II case was treated with serum.

15. Cutter, aged 40, had a temperature of 102° F. with one lung involved. He was given 180,000 units of serum. He felt very comfortable 24 hours after the serum was given and recovered rapidly.

Unfortunately, complete data are not available as to when the serum was given in the course of the disease.

From the analysis of these fifteen serum-treated cases, the administration of serum would appear to give very favourable results. In no instance did the physician state that it was of no effect, although there was one case where there was a thermal reaction and the serum was not continued after a small initial dose. A number of the doctors stated that the serum produced marvellous results.

SUMMARY

An analysis is made of 1,003 pneumococcus typings by the Neufeld method on sputa and pathological fluids, and the incidence of the various types recorded. The specimens were from physicians in private practice, and 60 per cent were from rural districts.

Questionnaires were sent to the physicians. In 306 cases of pneumonia due to the pneumococcus there were 9.5 per cent of deaths. In those cases where a pneumococcus was found but there was no pneumonia the majority showed evidence of an upper respiratory infection.

In 88 cases of empyema due to the pneumococcus there were 15 per cent of deaths. Seventy-six per cent of the cases and 85 per cent of the deaths were in males. Fifty-seven per cent were in Type I.

The incidence of Type I in the sputa of children was small as very few laryngeal swabs

were submitted to the laboratory. Of the 88 empyemas, 47 per cent were under 10 years of age in Type I, while in Group IV 75 per cent were over 10 years of age.

The incidence of herpes, delirium and complications is recorded. An analysis of 9 cases of pneumococcic meningitis is made. Of the 49 cases of Type I pneumonia, 14 were given serum and of 13 cases of Type II only one was given serum. Favourable results are noted.

I wish to express my sincere thanks to Dr. A. L. MacNabb, Director of Laboratories of the Province of Ontario, under whose direction this work has been carried on.

THE RADIOSENSITIVITY OF BENIGN SKIN CONDITIONS*

BY C. M. HENRY

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ACCORDING to Dr. A. U. Desjardins,[1] Mayo Clinic, radiosensitivity of a cell is related chiefly to its natural life cycle, as lymphocytes, whose metabolic cycle among human cells is the shortest, are the most radiosensitive, and nerve cells, the life cycle of which is the longest, are the most resistant to irradiation. Also, he states that pathological cells are more radiosensitive than normal cells of the same kind, but this is only to the extent that the rate of mitosis is the same. Hence, for the purpose of this paper, skin tumours come in the middle class, between that of the radiosensitive lymphoid cells, on the one hand, and the resistant nerve cells, on the other.

The term "radiosensitivity" may be defined as a relative susceptibility of normal or pathological cells or tumours derived from such cells to a given dose of x-ray. Estimating the dose of x-ray, whether it be by the roentgen or by the K.V.P. method, to produce an erythema or necrosis on normal skin, and knowing the life-cycle pathology of the benign tumour in relation to the normal cells, one is in a position to estimate the dosage of x-ray required to destroy the growth.

Disappearance may occur either by necrosis or body-tissue absorption. It is beyond the limit of this paper to mention, let alone describe, all of the skin lesions amenable to x-rays. My purpose is to describe a few of the more common lesions met with in every day practice, and name only some others that should receive attention. Radiotherapists should know the value of x-rays in the treatment of benign skin conditions, so that they can impart this knowledge to the medical profession at large.

Verruca and *clavus* (warts and corns) of all types, hard, soft, or papillomatous, are composed of hyperplastic epithelium, and require a destructive skin-dose of superficial x-ray. Exceptions are the plantar wart, which is much more radiosensitive; this requires about three erythema doses. However, the senile variety is not radiosensitive.

Senile keratosis requires a skin-destructive dose of superficial x-ray, without a filter.

Painful keloids of the skin, following a surgical operation, or from burns, are softened and flattened and rendered painless by treatments with a slightly less than a destructive skin-dose. given at intervals of two to four months. Time should be given for absorption and the formation of soft fibrous tissue. The more severe cases can be reduced in one year. Relief from pain is often experienced shortly after the first application, employing the unfiltered superficial x-ray.

Nævi, either of the flat or cavernous type, respond to x-ray. However, it has proved more beneficial to employ a suitable filter, depending on the depth of the mass, and K.V.P. of 130. Intervals of two to three months between sittings are advisable to allow for fibrosis to occur.

Pruritus vulvæ and *ani*.—This distressing and debilitating condition is always benefited and often cured by either superficial or moderately deep x-ray therapy. If patients can return at ten-day intervals, a skin erythema superficial dose, without filter, is often curative, but if the patient is unable to remain for the fractional treatment, beneficial results may be obtained by giving a filtered dose, using 5 mm. of aluminum,

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with moderate K.V.P. of 130, 12-inch distance, 5 milliamperes, for 25 minutes.

Eczema.—All subacute and chronic cases, as well as intertrigo, respond to superficial x-ray treatment. Eczema in children responds extremely well. Exposures may be given at ten-day intervals, administering from a quarter to three-quarters of an erythema dose. Care should be taken not to over-expose or continue the treatments too long. Sometimes one sitting is sufficient and results are obtained in a week to two weeks. For more chronic forms of the disease repeated exposures every ten days to two weeks are necessary.

Acne vulgaris.—X-ray treatment is a great aid to constitutional treatment, as this condition is usually due to both local and constitutional causes. When other means fail, an erythema dose is given and may be repeated at monthly intervals. If unbenefited, do not expose more than three or four times. I find that the mercury quartz lamp is a splendid aid to the x-ray in securing early benefit.

Furunculosis.—In cases where suppuration has not occurred, one sitting, using an erythema dose and two to three mm. of aluminum filtration, will abort and alleviate pain within twenty-four hours in the majority of cases.

Hyperhidrosis.—The habitual localized forms, as on the hands, feet, and axilla—not the nervous type—respond to the correct dose of x-ray. The dose is equal to an epilation treatment, and one treatment may be sufficient. The treatment, however, may be repeated in one month, if not successful after the first attempt. When satisfactory results are obtained you will have a life-long, grateful patient.

Infectious diseases.—(*a*) Mycosis fungoides; (*b*) ringworm of the scalp; (*c*) sycosis. With these you are well acquainted, and they require a single epilation dose. The treatment should not be repeated, except at a long interval, to prevent the possibility of permanent alopecia. Ringworm of the face in children will often yield to a single dose of a three-quarter erythema intensity.

Impetigo gives a pleasing result a few days after treatment by administering one-quarter to one erythema dose without filter.

Erysipelas.—If local, x-ray treatment is preferable to every other form of treatment. The results are so astonishing at times that referring physicians doubted their diagnosis. Temperatures of 104 to 105° often fall to normal within twenty-four to forty-eight hours. Pain, swelling, and constitutional symptoms alike disappear and the patient may return to work within one week. The earlier the x-ray exposure can be made over the infected area, the more rapid the result. One exposure only is necessary. From one to two erythema doses are necessary, using a filter of two to three mm. of aluminum, and from 120 to 140 K.V.P. The mercury quartz lamp treatments in erythema doses are also producing good results. Dr. G. E. White[2] has shown the mortality rate has been greatly reduced since following the later methods of treatment in this morbid infection among young children.

There are many varieties of lesions about the eye which are amenable to superficial x-ray, and as one gains experience in treating superficial skin lesions in other parts of the body, and one knows the exact output in kilovoltage and erythema skin dosage developed by his x-ray outfit, then, and then only, should he feel competent to treat benign lesions about or of the orbital area.

Blepharitis, eczema of the lids, papillomata, keratosis, and many other conditions, both benign and malignant, as described by Dr. Richards,[3] respond to x-ray treatment. Some conditions, due to their location, are better treated by radium.

There are also many other skin conditions, infections, and lesions for which x-ray treatment is beneficial. In those mentioned, however, it has been proved that x-rays have either produced a permanent cure, or been an aid in producing beneficial results. However, it should be known absolutely what distance, size of portal. K.V.P., filtration, milliamperage, and time, gives an erythema reaction on the skin, and the dosage be judged accordingly. Underdose rather than overdose, and watch carefully, recording all reactions, and you will treat wisely.

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CHILDHOOD TUBERCULOSIS*

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IN everyday life about a sanatorium the children with their first infection type of pulmonary tuberculosis cause little concern as compared with the adults suffering from phthisis. In this paper the relative simplicity of the childhood type is stressed, but at the same time it is pointed out that even this early phase may be more involved if the unstable and more chronic cases are considered. In addition, it is noted that much of the relative simplicity of childhood type of tuberculosis is lost if one delves into the literature.

It would be a fine thing if one could make satisfying generalizations about tuberculosis, but in every attempt to do this the many exceptions and variations tend to undermine any attempt at conclusions. The very length of a chronic disease makes the study of its complete development difficult and involved. Not only this but in tuberculosis there are so many starters for every one who may complete the course. Many will have to be watched through the years to come, to find the few in whom full development proceeds from start to finish. This is none the less true when one remembers that exposure to exogenous reinfection is probably a very intermittent thing through life, as also are the predisposing stress and strain to which any individual may be exposed. It is then scarcely to be considered strange that the study of the relationship between the benign first disease and the later destructive type may prove confusing. On the other hand, the primary complex found in children seems relatively simple if considered apart from its relationship to the more serious destructive type of adult life. The *discovery* of the disease in this phase tends to be of a routine nature, since a history of contact more often than symptoms brings the child for examination. The *diagnosis* is made by tuberculin-testing and the x-raying of positive reactors. The *treatment* is simple, and provided there is the assurance of reasonably good care the favourable *prognosis* is easily made. This satisfactory outlook is further justified by the low death rate at this age from pulmonary lesions. The recessive *course* is readily followed by serial x-rays. To sum up, then, the case-finding, the treatment, the prognosis, the course, and, to a less extent, the diagnosis are much simpler than is the case with phthisis. However, among these patients are some showing instability, with spreads from pre-existing lesions accompanied by exacerbations of fever. In others pleural effusion occurs, and in still others there is evidence of prolonged smouldering of the disease, particularly in the lymph glands. This latter reminds us of the warning of Ghon that "this is a field which is with difficulty accessible to all clinical methods, easily recognizable as it is anatomically". This sort of case may go a long way towards justifying institutional observation and care.

There are, too, the difficulties of diagnosis to be thought of. However, if consideration is given to the age of the patient, destructive lesions are much less often seen before puberty than after. While the evidence of involvement of the lymphatic glands is more prominent in children, one has to be careful as to what may be considered abnormal in considering the hilum. Calcium deposits occur more regularly in the primary complex both at the parenchymal and the lymphatic poles, but this comes too late to be of any help in distinguishing the type of early infiltrations. The older the individual, the greater the difficulty, for at puberty and after the lesions tend to be more localized and more often in the upper portions of the lung; lymphatic involvement is less pronounced. For this age the responsibility of the diagnosis of a lesion as primary is greater, for here the destructive lesions are more common and the death rate is so much higher.

Recent literature tends to present this superficially simple phase of tuberculosis as a very complex problem indeed. Some are satisfied that a small dosage suffices to produce these

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lesions, with the course depending more on the variations of resistance than the dosage, while others stress the need of intimate contact with a case of phthisis. One school contends that this type of disease needs little care, and that the outcome is always favourable, while others fail to understand how, in recent years, primary lesions are considered to be invariably benign. They contend that this is not borne out by the facts. Again, in considering the white population after the age of fifteen, the first exposure to tuberculosis is said to produce lesions of the adult type invariably. On the other hand, others feel that, regardless of age, primary disease is considered to be invariably benign, whether it occur in the adult or in the child. First infection is defended for the immunity it produces, condemned for rendering the tissues sensitive, or simply regarded as the initiation of a progressive disease that is uninfluenced by exogenous reinfection. Some have swung from a solicitous care for all children reacting to tuberculin to the other extreme of more or less disregard of the ailing child. In the meantime, perhaps a more conservative course might be indicated, and, locally, this is being followed, namely, in providing beds for the children with easily demonstrable lesions of an active type whose homes offer no reasonable outlook for proper care.

AN EXAMINATION OF THE MOUTHS OF ESKIMOS IN THE CANADIAN EASTERN ARCTIC

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THE clinical findings recorded below were obtained during the Canadian Eastern Arctic Patrol of 1937, on the R.M.S. *Nascopie*. Although the examinations were made with another object in view the results are deemed to be of sufficient interest to merit publication. An attempt will first be made to define the terms used in this report, in order that one important and usual source of confusion may be eliminated.

TABLE I.

FIFTEEN CASES EXAMINED AT WOLSTENHOLME, QUEBEC, HUDSON STRAIT

Apparent age males	*Type*	*Teeth missing*	*Dental caries*	*Pyorrhœa*	*Sordes*	*Tonsils*	*Tongue*
6	Relatively pure Eskimo	1	Nil	Nil	Nil	Very small	Clean
17		None	"	"	"	"	"
19		"	"	"	"	"	"
27		"	"	"	"	"	"
27		"	"	+	"	"	"
28		"	"	Nil	"	"	"
30		"	"	+ + +	"	"	"
38		"	"	Nil	"	"	"
40		"	"	+ + +	"	"	"
40		"	"	+ + +	"	"	"
45		"	"	+ + + +	"	"	"
45		"	"	+	"	"	"
50		"	"	+ + +	"	"	"
50		"	"	+ + + +	"	"	"
51		3	1	+	"	"	"

Apparent age.—No native encountered knew how old he or she was. The ages given in the tables are estimates as judged from the patient's appearance in terms of white man's age.

Type.—The Eskimo habits of life have for long so differed from ours that it would seem important in any examination of their health to try to establish whether the patient is a relatively pure type or not. The author had had no previous experience, and it was only possible to note gross deviations. Cases where there was obviously white or negro blood in the ancestry have been listed accordingly: the

TABLE II.

EXAMINATION OF 9 CASES FROM CAPE DORSET, BAFFIN ISLAND

Apparent age		*Type*	*Teeth missing*	*Dental caries*	*Pyorrhœa*	*Sordes*	*Tonsils*	*Tongue*
M.	*F.*							
	22	Relatively pure Eskimo	None	Nil	Nil	Nil	Very small	Clean
	25		2	1	"	"	"	"
	28		None	Nil	"	"	"	"
	30		"	"	"	+	"	"
36			1	1	"	Nil	"	"
37			None	Nil	"	"	"	"
40			"	"	"	"	"	"
	45		3	"	"	"	"	"
	50		9	"	"	"	"	"

TABLE III.

EXAMINATION OF 82 CASES AT PANGNIRTUNG, BAFFIN ISLAND

Apparent age M.	Apparent age F.	Type*	Teeth missing	Dental caries	Pyorrhœa	Sordes	Tonsils	Anterior cervical glands	Tongue
	4		None	Nil	Nil	Nil	Not seen	Nil	Clean
	4	White	"	2	"	"	Very small	Palpable	"
	5		"	Nil	"	"	Chronic tonsillitis	"	"
	5		"	"	"	"	Very small	Nil	"
	6		"	"	"	"	"	Palpable	"
	9		"	"	"	"	"	Nil	"
	12		"	"	"	"	"	"	"
14			"	"	"	"	Enlarged	"	"
	14		"	"	"	"	Very small	"	"
	14		"	"	"	"	"	"	"
	15	White	"	1	"	"	"	Palpable	Dirty
	15		"	Nil	"	"	"	Nil	Clean
	16	Negroid	1	1	"	"	"	"	"
	16	Negroid	None	Nil	"	"	Greatly enlarged	"	"
16			"	"	"	"	Very small	"	"
	16		"	"	"	"	Greatly enlarged	"†	"
16			"	"	"	"	Very small	Enlarged	"
	17		"	"	"	"	"	Nil	"
17			"	"	"	"	"	Palpable	Dirty
17			"	"	"	"	"	Nil	Clean
	18		"	"	"	"	"	"	"
18			"	"	"	"	"	"	"
18			"	"	"	"	"	"	Dirty
18			"	"	"	"	"	"	Clean
18			"	"	"	"	"	Enlarged	"
	18	White	"	"	"	"	"	Palpable	"
	18		"	"	"	"	"	Nil	"
	20		"	"	"	"	"	Palpable	"
	20		"	1	"	"	"	Nil	Dirty
21			"	Nil	"	+	"	Palpable	Clean
21		Negroid	"	"	"	Nil	"	"	"
22			"	"	"	"	"	Nil	Dirty
22			"	"	"	"	"	Palpable	Clean
22			"	"	"	"	Enlarged	"†	"
22			"	"	"	"	Very small	Enlarged	"
22			"	"	"	"	"	Nil	"
	24		"	"	"	"	"	"	"
25			"	"	"	"	"	"	Dirty
25			"	"	"	"	"	Palpable	Clean
25			None	Nil	Nil	Nil	Very small	Nil	Clean
	25		"	"	"	"	"	"	"
26			1	"	"	+	"	Palpable	Dirty
26			None	"	"	Nil	"	Nil	Clean
26		White	"	"	"	"	"	"	"
	26		"	"	"	"	"	"	"
27			"	"	"	"	"	Palpable	"
	28		"	"	"	"	"	Nil	"
28			"	"	"	"	"	"	Dirty
28			"	"	"	"	"	"	Clean
28			"	"	"	"	"	"	"
30		White	1	"	+	+	"	"	"
	30		None	"	Nil	Nil	"	"	Dirty
	32	White	"	"	"	"	"	"	Clean
32			2	"	"	"	"	"	Dirty
32			None	"	"	"	"	Palpable	Clean
34			"	"	+ + + +	+	"	Nil	"
34			1	"	+ + + +	Nil	"	"	"
	34		None	"	Nil	"	"	"	"
	34		3	"	"	"	"	Palpable	"
35			None	"	"	"	"	"	"
	35		1	"	"	"	"	Nil	Dirty
	35		None	"	"	"	"	"	"
	36	Negroid	"	"	"	"	"	Palpable	"
	37		"	"	"	"	"	"	Clean
	38		"	"	"	"	"	Nil	"
	45		"	"	"	"	"	"	"
	45		3	1	"	"	"	"	"
	45	Negroid	1	Nil	"	"	"	"	"
	50		5	"	"	"	"	"	Dirty
50			3	"	+ + +	"	"	"	"
50		White	11	1	+	+ +	"	"	Clean
50			None	Nil	Nil	Nil	"	"	"
50			2	"	"	"	"	"	"
50			None	"	+	"	"	"	"
50			3	"	Nil	+	"	"	"
	55		5	"	"	Nil	"	"	"
	60		2	"	"	"	"	"	"
	60		1	"	"	"	"	"	"
	60		5	"	+	"	"	"	"
	65		26	"	Nil	"	"	"	"
	65		4	"	"	"	"	"	"

*Unless otherwise stated, the types were "relatively pure Eskimo".
†Operation scars in the neck.

remainder can only be regarded as "relatively pure Eskimos".

Teeth missing.—The total number of teeth missing in each mouth is indicated: "none" missing clearly signifies that all the teeth were present. Not knowing the eruption periods of the permanent teeth in the Eskimo, it was only possible under the conditions of examination of girls and boys to note vacant spaces in the dentures.

Dental caries.—The number of decayed teeth per mouth is shown; "nil" is intended to mean that no teeth were decayed.

Pyorrhœa.—If pressure from a spatula upon the gum margin against the teeth caused the welling up of yellow secretion, the person was said to have pyorrhœa. The extent of the affection and the quantity of the discharge were graded together from plus to four plus.

Sordes.—By this term is meant that collection of general filth, consisting of epithelial matter, food, and microörganisms, heaped up upon the teeth at the gum margins, which is commonly seen in white man in our public wards. It was quantitatively graded plus to four plus.

Tonsils.—The size of the visible portions of the tonsils was noted as follows. "Very small" indicates that a very little or no tonsillar tissue could be seen in the tonsillar fossæ; when the surfaces of the organs were approximately flush with the pillars of the fauces the tonsils were described as "enlarged"; when they bulged forwards well beyond the pillars, and were obviously not quiescent, they were called "greatly enlarged". No acute infections were seen. Neither were any cases met with exhibiting hypertrophy with patent crypts where one was able to express caseous material, except in one instance where although no caseous material could be found the tonsils were enlarged and ragged. This case was labelled "chronic tonsillitis".

Glands.—The anterior cervical glands at the angle of the jaw were examined in most cases. "Nil" indicates in the tables that none could be felt; "palpable" that they could just be felt; and "enlarged", that they were abnormally large.

Tongue.—The condition of the tongue was noted. If it was red, moist, and not indented by the teeth, it was called clean; if white or furred it was described as "dirty".

The number of cases showing missing teeth (26), dental caries (9), and sordes (7), out of a total of 106 of all ages, is striking. Of the 16 cases of pyorrhœa, 9 were found in the 15 patients seen at Wolstenholme on the northern shores of Quebec in Hudson Strait, and only 7 in the remaining 91 examinations.

Although the author has no statistics of the condition of the mouths of civilized man as seen in our public wards to offer in comparison, it is felt that the above findings show far superior health and hygiene. The relative quiescence of the tonsils is noteworthy. It may be mentioned that these natives have very little immunity to respiratory infections.

Any attempt to understand underlying factors in the Arctic is confronted with serious obstacles. First and foremost is the inability of the patient to cooperate, owing to the language difficulty. Since there are very few white men in our Eastern Arctic who can speak Eskimo sufficiently well to obtain accurate information the questioning of the natives is almost futile. The question of diet leads to further trouble. Their food seemed to fall somewhere between the limits of (1) purely native diet, and (2) partly civilized diet, depending upon how much contact they make with civilization at the trading posts.

TABLE IV.

SUMMARY OF 106 CASES (IRRESPECTIVE OF AGE)

	Teeth missing		*Dental caries*		*Pyorrhœa*		*Sordes*		*Enlarged tonsils (105 cases)*	
	M.	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*	*M.*	*F.*
Number of cases.	11	15	3	6	15	1	6	1	2	3
Total number of cases.	26		9		16		7		5	

1. *Purely native diet* has consisted, as far back as the memory of whites and natives extends, of seal, walrus, caribou, fish, more rarely birds, eaten sometimes raw sometimes "cooked". Cooking consists in placing the food in a pot of water suspended over a seal oil lamp for four to six hours. The temperature of the water, however, remains so low that one's

finger may comfortably be placed in it, and, moreover, no odour of the food cooked comes off the pot.

2. *Partly civilized diet.*—Whilst about the trading posts the Eskimo has access to civilized foods, particularly flour and sugar, which he adds to his native diet. The impossibility of ascertaining under present conditions the contact made with civilization, and therefore to what extent carbohydrates have entered into an individual's diet is at once apparent.

It is beyond the scope of this paper to discuss the factors responsible for the excellent condition of these native mouths. The author may however perhaps be permitted to say that his impression is that over all the average Eskimo's food consists almost exclusively of meat and very little carbohydrate, and, further, that he is forced by the nature of his food really to use his teeth.

Thanks are due to Major D. L. McKeand, Dr. L. D. Livingstone, and members of the Hudson's Bay Company for their courtesy and assistance.

Therapeutics and Pharmacology

SOME BRIEF NOTES ON DYSMENORRHŒA

BY W. DEAN MACDONALD

St. Catharines, Ont.

By dysmenorrhœa we mean, in this very brief discussion, any discomfort appearing at the time of the menstrual flow that is absent between the periods, and not caused by active disease, such as endometriosis, inflammations, malplacements or tumours, whose treatment is surgical. Dysmenorrhœa has to be considered as a symptom and always treated as such. It should also be considered as more serious than is usually the case, and a correct diagnosis must be made.

What *is* the cause of this particular patient's pain? If this is not known it cannot be treated intelligently, or satisfactorily. The importance of hysteria, neuroses, personal idiosyncrasy, hypersensitiveness, mentality, constitutional disturbances, etc. must be evaluated. This is often the most important single factor in treating the majority of women with functional dysmenorrhœa.

Treatment is based on general measures. A daily warm bath at night the week preceding and *during the period* is a great help. This is better if followed by heat in bed, and the bowels kept open by mild laxatives. Physical exercises are, it is generally agreed by authorities, of the utmost help by correcting faulty postures and increasing muscle tone. It has long been known that girl athletes in good condition, living an out-of-door life, suffer much less than socially inclined persons. Many cases will respond to these measures, but some will not. For these it is well to remember the following points. Alcohol and opium should never be given. It has recently been shown that some patients with low fasting blood sugars, or a low sugar-tolerance curve, and even some with normal estimations, receive from partial to complete relief by increasing their carbohydrate intake, beginning 2 or 3 days before the expected date of the period. Twenty-five c.c. of 50 per cent glucose in the vein during the severe pains has given immediate relief. Bromides between and during the periods do help nervous cases. In very severe cases where the pain is colicky and crampy, present since the first period, begins with the flow and lasts 8 to 24 hours, a good prescription to remember is: atropine 1-200 gr.; luminal 1-2 gr.; ext. hyoscyamus 1 gr.; pyramidon 5 gr. in a capsule three times a day, beginning 2 days before the period. The case that is most likely to give good results by dilating the cervical canal or incising the internal os is the one that responds to the above capsule with atropine, and even this form will return sometimes in 6 to 24 months.

Endocrine therapy is too young and too controversial a subject to be dealt with here, but a few points are worth mentioning. Some patients will be helped by a reliable preparation of corpus luteum extract. If there is genital hypoplasia theelin or some other follicular hormone should be added in proper doses. Should the case be one of pituitary deficiency it must be treated as such, or if a hypo-oöphorism it must be treated for that and the dysmenorrhœa will often clear up as the whole case improves. If the dysmenorrhœa is associated with excessive bleeding ovarian therapy is contraindicated.

Small doses of thyroid very often help, even if the basal metabolic rate is normal, particularly if there are any signs or symptoms of deficient thyroid secretion.

Emmenin in 1 to 2 drachm doses in water, taken slowly throughout the day, starting 48 to 72 hours before the period, will give good results in a large percentage of cases.

There is a *fatigue dysmenorrhœa;* for this rest is imperative.

Nasal disease will often give pain at the menstrual period. The correction of this will some-

times give complete relief, and a thorough nasal examination is indicated in any unrelieved and persistent dysmenorrhœa. A procedure too seldom tried is treating the "genital spots" in the nose. These are located at the lower and anterior end of the inferior turbinates and the adjacent portion of the septum, the tuberculum. They can often be seen as swollen, red, and tender areas at the period. If the pain can be controlled by the application of 20 per cent cocaine to these spots in each nostril (by a competent rhinologist) then cauterization of the spots is indicated for more permanent relief which may last for years. The cases for this treatment are those in which the pain persists long after the flow has started.

AN AID IN HEARTBURN AND THE VOMITING OF PREGNANCY

BY A. E. MOWRY

London, Ont.

The use of dilute hydrochloric acid in pregnancy is by no means new. This preparation has been used with varied success for years by many practitioners.

There are two main indications for its use in treating the parturient: (1) nausea and vomiting, and (2) heartburn.

It has been shown by analysis that there is a decrease of the acid gastric juice during pregnancy.[1] This occurs in a large percentage of cases. It has also been shown that a considerable proportion of sufferers with distressing symptoms will respond to dilute hydrochloric acid.[1, 2] To keep the treatment standard, we have been using the dilute acid in 15 minim doses. This is administered in a large glass of water, and the patient is instructed to sip it with her meals.

The beneficial results obtained by the majority of patients with nausea or vomiting of pregnancy are definitely established. For these complaints the patient is also instructed to eat frequent small meals. In some cases a barbiturate is prescribed as well. The majority of these patients state that they feel the drops are beneficial. They are known to give relief in a few hours, but sometimes take several days.

Heartburn during pregnancy generally occurs in the later months. The same treatment with the drops is used. It has been noticed that patients with this symptom usually have it following the evening meal or at bedtime. As a rule the improvement is rapid.

It is willingly admitted that this form of treatment is not a panacea for heartburn and vomiting. However, the high percentage of success found in a series of cases to be published shortly forces one to conclude that this simple treatment is efficacious and a fairly consistent aid in these annoying complaints of pregnancy.

1. *J. Obst. & Gyn. of Brit. Emp.*, 1935, **42**: 1.
2. *Am. J. Obst. & Gyn.*, 1930, **20**: 382.

Case Reports

SCARLET FEVER MASTOIDITIS, WITH SINUS THROMBOSIS, AND JUGULAR LIGATION*

BY G. EDWARD TREMBLE

Montreal

The following case was thought to be of sufficient interest to warrant publication because of the difficulties of diagnosis, the operative findings, and the ultimate result.

Peter J., aged five years, developed an acute suppurative otitis media on the right side following a cold. Paracentesis was done on June 15, 1935. The ear discharged profusely for two weeks and then stopped suddenly. The patient began running a late afternoon and evening fever, and it was deemed advisable to make a larger incision in the drum for freer drainage. Shortly after the second paracentesis a rash appeared, which was diagnosed as scarlet fever by the attending pædiatrician. As a result the child was isolated at home. The ear was syringed every four hours and alcohol drops were instilled, but the discharge continued to run freely rather than subside. Toward the end of July, that is, five weeks after the ear was first opened, the patient complained of a headache in the right temporal region, his temperature ranging from 101 to 102° F. in the afternoon and evening. Instead of the ear quieting down, granulation tissue appeared at the junction of the drum with the roof of the canal. In the presence of mastoid tenderness over the antrum and the tip, conservative treatment seemed useless and operative measures imperative. He was admitted to hospital August 8, 1935.

The family and personal history contained nothing of special note.

Operative findings.—The right mastoid was very extensive and found to be filled with pus and granulations, due to the long duration of the infection. The mastoid cells were broken down, forming one large abscess cavity with numerous zygomatic cells. A large terminal cell was found, so the whole tip was removed. The lateral sinus and middle fossa were not exposed. Plain packing gauze was inserted, enclosed in rubber tissue, and the wound was left open. Immediately following the operation the temperature dropped to normal, and the patient was discharged from the hospital within a week.

The wound partially healed and then appeared to become indolent. One month after returning home both the canal and the post-auricular wound were still discharging pus and this had become definitely odorous. The child had little inclination for food, owing to nausea.

* This case was presented before the Oto-laryngological Section of the Medico-Chirurgical Society in Montreal on three occasions in the past year and a half.

A definite fullness was noted on the side of the head above the right ear, which developed into a swelling, giving a marked asymmetry of the face,—causing pain on opening the jaw. In view of these symptoms and the fact that he "was sick at his stomach" it was decided to have the child admitted to the Alexandra Hospital and again explore the mastoid. This was done on September 25th.

On admission the physical and neurological examinations were negative except for a white cell count of 10,000. The mastoid wound was re-opened with the assistance of Dr. D. H. Ballon and all the granulation tissue removed. After exploring the cavity carefully, a pair of blunt-pointed forceps was inserted under the temporal muscle as it appeared to be ballooned up. A gush of thick yellow pus came away, estimated at about half an ounce. This proved on culture to contain *S. hæmolyticus*. In view of this finding it was thought there was sufficient to account for the symptoms, so the lateral sinus and middle fossa were not uncovered. For a few days the fever seemed to be subsiding, but on the fifth day the temperature went up to 106.2°. Early the same evening Dr. R. R. Struthers, the attending pædiatrician, made the following note. "There is a marked loss of weight and colour in the past week. Heart and lungs clear. Enlarged bean-sized gland below the right mastoid which is not tender. Mouth and throat clear. Reflexes normally active. No neck rigidity—no Kernig. Pupils equal and react to light. The spleen is enlarged on percussion upwards and is readily palpable—descends one and one-half fingers' breadths below the costal margin and is soft and smooth. Liver not felt. Abdomen otherwise negative. There is no purpura. Blood culture advised. Repeat W.B.C."

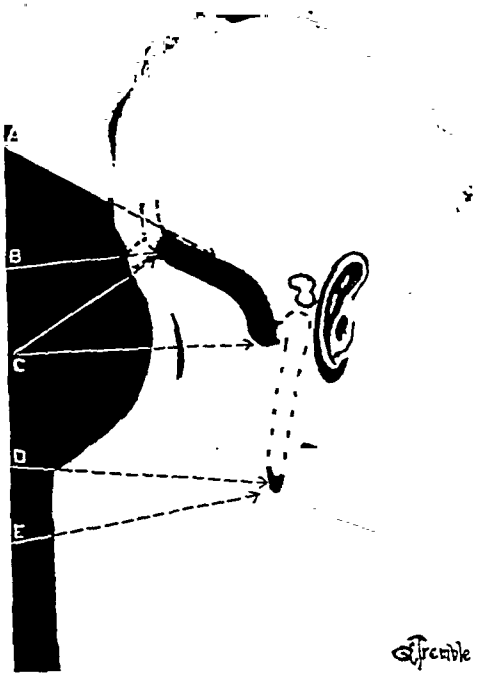


Fig. 1

A. Lateral sinus opened and free bleeding obtained after ligating the jugular vein October 1st.
B. Free bleeding at torcular October 13th.
C. Whole of lateral sinus closed by a thrombus from the jugular bulb to the torcular Herophili October 13th.
D. Clot removed from jugular bulb by suction October 13th.
E. Internal jugular vein ligated October 1st.

Three hours later, Dr. W. V. Cone reported in summary: "*No evidence of central nervous system involvement.* Differential diagnosis, it would seem to me, lies between brain invasion, meningitis and sinus thrombosis. The first two are ruled out by examination. Impression —sinus thrombophlebitis."

In view of this examination and the fact that the white blood count jumped from 14,000 to 17,950 the same day, the child was taken to the operating room and the jugular vein on the right side ligated. The mastoid wound was explored and the lateral sinus itself appeared healthy with active pulsations; the vein was incised and free bleeding occurred without any evidence of clot. Plain packing gauze was inserted and the child returned to the ward. A few hours later a transfusion of 250 c.c. of citrated blood was given on the suggestion of Dr. Struthers. Two days after the operation (October 3rd) a pleuropericardial friction rub was heard. It was also mentioned in the bedside notes that the blood culture taken at the time of the operation showed no growth.

The child continued to run a septic type of temperature, with a beginning enlargement of the spleen, in spite of repeated transfusions. Although the mastoid wound seemed to granulate well and the jugular incision healed readily the boy's general condition did not improve. On October 10th a slight stiffness of the neck appeared and also a definite blowing systolic murmur. Dr. Cone examined him again on this date, and found that there was as much pain on rotating the head as when the chin was flexed on the chest. He noted that the boy was bright and cooperative, the central nervous system was normal, and he did not feel that meningitis was present. Dr. H. B. Cushing was asked to see the patient, but his examination failed to disclose any abnormality except that due to the local condition in the ear. In view of all the findings, the diagnosis seemed narrowed down to a lateral sinus thrombosis with jugular bulb involvement or septicæmia. As repeated blood cultures proved negative it was decided to explore the lateral sinus again.

On October 13, 1935, the child was again taken to the operating room and the mastoid wound re-opened. The lateral sinus was exposed and the absence of pulsations noted. As the wall of the lateral sinus appeared thickened and discoloured an incision a quarter of an inch long was made without free bleeding. On pressure, small pieces of organized clot were expressed. The whole length of the lateral sinus was uncovered from the jugular bulb to the torcular Herophili and found to be filled with a liver-coloured clot. (This had formed in the previous twelve days, because the sinus had been opened less than two weeks previously, when active bleeding took place.) On approaching the torcular there was a slight oozing, evidently from the lateral sinus of the other side and also from the straight and longitudinal sinuses. A large Eustachian catheter was connected to the suction pump and the remaining clot removed from the torcular. After free bleeding occurred the upper part of the wound was packed tightly and suction applied to the jugular bulb. A long clot was drawn into the suction bottle which evidently extended down to the ligature. This lower part of the wound was irrigated with hot normal saline and plain packing gauze lightly inserted. The child was returned to the ward and 200 c.c. of blood given intravenously. On the day after the operation there was a sudden drop in temperature from 105°, followed by a definite chill, which lasted six minutes. For the next few days, as the chills continued, Dr. Struthers ordered repeated blood transfusions, although the blood cultures showed no growth. At first the mastoid wound was dressed every day, and then every second day, as the enlarged spleen disappeared below the costal margin and the wound began to granulate. On the suggestion of Prof. E. G. D. Murray, the wound was irrigated with acriflavine, 1 in 1,000 in 2.5 per cent saline. After mopping this out a

mixture of fresh human serum and streptococcal antitoxin (scarlatinal) was instilled. Plain packing gauze was then inserted, soaked in acriflavine. Although this dressing appeared to hinder the formation of granulation tissue the wound healed up entirely in two and a half months.

Following the last operation the child became very irritable and resented attention of any kind. His convalescence was not entirely uneventful, as pain and tenderness developed over the great trochanter and then later in the right groin. This caused a neuritis of the sciatic nerve which remained troublesome for some weeks. On October 29th the boy complained of a sharp pain over the lower part of the right side of the chest on respiration and signs were found of a pulmonary infarct.

In spite of these complications, the child's general condition continued to improve. He was finally discharged from the hospital on November 13, 1935, with the note, "patient is weak but is progressing favourably".

The boy was given nine blood transfusions during his stay in the hospital, averaging 200 c.c. each time. It was thought that a plastic operation at a later late would be necessary to remove the scar, the incision having extended from the mastoid tip to the torcular Herophili. However, nothing further was done and today he is normal in every way.

OTITIC SEPTICÆMIA IN A DIABETIC*

BY R. SCOTT-MONCRIEFF, B.A., M.D. AND JOHN T. MACLEAN, M.D.

Montreal

The case history of this child is of interest in being an example of the fact that it is possible to control seemingly overwhelming infection in a severe diabetic. Our diagnosis in the case was diabetes mellitus, with acute right frontal sinusitis; acute exacerbation of a chronic right suppurative otitis media, with mastoiditis; lateral right sinus thrombosis; and septicæmia (*S. beta-hæmolyticus*).

CASE HISTORY

H.E., male, aged 16, was a diabetic of five years' standing and had been admitted to the Royal Victoria Hospital several times previously for the control of his disease. His mother was an intelligent woman who had managed his condition very satisfactorily through many minor infections. Eight years before this admission, and again two years prior to admission, he had had an acute right suppurative otitis media.

On September 26th the patient was admitted to the Royal Victoria Hospital, and gave the following history.

Ten days before he had developed an acute rhinitis, after which the chief complaint was headache, mostly in the right frontal region. He complained at intervals also of right-sided earache, and reported that there had been some thin discharge from the ear about three days after the onset of the rhinitis.

Physical examination.—Acutely ill; slight general under-development; photophobia. Temperature 103°; pulse 138; respirations 26.

Ears.—Right drum thickened and red, especially in the region of the membrana flaccida and alongside the handle of the malleus; slight fullness. Quite severe tenderness of the right mastoid, particularly over the antrum, and slightly over the posterior part of the process.

Nose.—Thick pus in the right middle meatus. Tenderness over the floor of the right frontal sinus. Throat.—Thick pus coming from the nasopharynx. Generalized congestion. Glands enlarged at the angles of the jaw and in the axillæ.

Heart and lungs.—Normal. Abdomen.—Liver edge palpable three fingers' breadth below the right costal margin. Spleen not palpated. Nervous system.—Considerable photophobia. The reflexes were all normal.

Laboratory findings.—Urine: albumin plus, sugar 2 plus, microscopically, negative. Blood sugar, 441 mg. per cent on admission. Blood count: Hgb., 79 per cent; red blood cells, 4,500,000; white blood cells, 19,400. The blood Wassermann test was negative.

Progress.—September 26th.—Myringotomy, right. Culture from the ear gave a pure growth of *S. beta-hæmolyticus*. Two days after the operation earache was absent. There was thin, yellowish pus from the ear and slight mastoid tenderness on the right side. Frontal sinus tenderness was almost absent. The nose was much clearer. Photophobia was absent and the temperature was normal. His condition remained thus for two days.

October 1st.—His temperature went up to 104°. The next day he had a severe chill; temperature 104°; blood culture negative. Insulin was given, 130 units per day. The following day he had another chill; temperature 104° and becoming swinging. Nose clear. The ear appeared much the same. There was still slight tenderness of the mastoid over the antrum and over the posterior part of the process. No other positive findings.

October 3rd.—Operation.—Simple mastoidectomy, right, with ligation of the jugular vein under ether. The mastoid was sclerotic and the cells were few and small, including the antrum which was situated deeply and decidedly high for the age. Granulations and pus were found in the antrum and the cells extending toward the tip. The lateral sinus was exposed, looked grey and thickened. The internal jugular vein was normal and was ligated below the junction of the facial vein. The lateral sinus was then incised but no thrombus could be demonstrated. Bleeding was controlled by external pressure with iodoform packing gauze. The temperature remained swinging. On October 4th, 5th and 6th, it reached a maximum of 105°, but thereafter gradually decreased until, on October 14th, the maximum was 101.3°.

October 10th.—Blood culture showed a scant growth of *S. beta-hæmolyticus*. This was the first of repeated blood cultures to be found positive, the highest count being 100 colonies per c.c. on October 18th. From October 15th to 23rd the temperature again became swinging, with a daily maximum up to 105° and minimum as low as 95°, but no chills. Blood culture on October 18th showed a profuse growth (100 colonies per c.c.) of *S. beta-hæmolyticus*.

October 20th.—Heart enlarged; gallop rhythm present and numerous extrasystoles. A rough systolic and a soft diastolic murmur were heard at the apex. October 21st.—The mastoid wound had been treated daily since October 3rd with acriflavine, 1:750 solution, poured into the cavity and left there for ten minutes. It was then sponged and a mixture of equal parts of human blood serum and scarlet fever antitoxin was poured on and left there. The wound was then lightly filled

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* From the Royal Victoria Hospital, Montreal.
Submitted for publication September 9, 1937.

with gauze soaked in acriflavine 1:750 in 2.5 per cent saline solution. By now it was nicely filled in with healthy granulations and the drum was well healed.

October 23.—Exploration of the mastoid wound; incision of the lateral sinus. The sinus was uncovered for about two inches back from the bend, and pus was found between the tables of the skull near the posterior limit of the bony excavation. A mural thrombus was found at the site of the previous incision and was removed by suction. There was free bleeding from both ends. The anæsthetic used was gas and oxygen with, locally, 1 per cent novocaine.

October 25th.—Blood culture showed 3 colonies per c.c., but it was found that the patient's immunity was such that the organism (*S. beta-hæmolyticus*) would not survive in the patient's clotted blood.

November 6th.—The first negative blood culture was obtained on this date. Three blood cultures taken at later dates were also negative. There was a steady trend of temperature towards a lower level and a general improvement in the patient's condition, although the mastoid wound granulated very slowly.

November 9th.—Incision of an abscess on the right side of the neck. The abscess was deeply situated beneath the central part of the neck wound. It had a thick capsule. About one dram of pus was evacuated and *S. beta-hæmolyticus* was grown from it in pure culture. Following this, recovery was uneventful.

December 12th.—Local condition on discharge.—The ear-drum was normal except for slight diffuse thickening. Hearing tests showed the auditory acuity to be almost normal, and approximately equal in the two ears. The mastoid and neck wounds were well healed.

TREATMENT

Diabetes control.—We feel very definitely that any infection in a diabetic should be treated as an emergency: that the blood sugar should be brought to a normal level immediately and maintained at that level as nearly as possible. As is well known, the diabetic who harbours infection demands an unusually high amount of insulin for control. This patient's normal requirement on a diet of protein 75 g., fat 90 g., carbohydrate 200 g., was 90 units per day. During the acute infection, on a diet of protein 60 g., fat 50 g. and carbohydrate 140 g., he required 130 units per day. The diet and the insulin were adjusted daily after the amount of sugar in the previous twenty-four hour specimen of urine had been estimated. Frequent blood sugars were taken to ensure control. The patient was discharged controlled on a diet of protein 80 g., fat 70 g. and carbohydrate 225 g., with insulin 8 - 8 - 20 - 20.

The wound was treated daily with acriflavine 1:750 solution poured into the wound and left for ten minutes. It was then sponged and a mixture of equal parts of human blood serum and scarlet fever antitoxin was then poured in and left there. The wound was then lightly filled with gauze, soaked in acriflavine 1:750 in 2.5 per cent saline solution.

Scarlet fever antitoxin, 20 c.c. intramuscularly, when the blood culture became positive.

Formolized vaccine prepared from the *S. beta-hæmolyticus* grown from the blood stream. A subcutaneous injection was given every third day from October 28th to November 25th, the first dose being 0.15 c.c. and the maximum dose being 0.5 c.c.

Repeated small blood transfusions of 150 to 200 c.c. of blood were given every second day from October 5th to November 1st. These were started even before the first positive blood culture was obtained.

SUMMARY AND CONCLUSIONS

This patient presented a very interesting problem, for not only did he have a rapidly progressing mastoiditis which very soon spread to involvement of the lateral sinus and to a streptococcal septicæmia but he was also a severe diabetic. As regards treatment, the two essential features were the control of the diabetes and the prompt, and perhaps drastic, operative procedures. It is interesting to note that the blood cultures rapidly became strongly positive, so that within a week of the first positive culture 100 colonies per c.c. were grown from the blood. Roughly a week later, the last positive culture was obtained, at which time the patient's immunity was such that the organism could not survive in his clotted blood.

Since so many different forms of treatment were used, it is impossible to assess the relative merits of each. But we do feel that the value of repeated small blood transfusions in the treatment of such types of infection should receive special emphasis.

We are indebted to Professor E. G. D. Murray for his kind assistance in the management of this case, and to Drs. E. H. Mason and Walter de M. Scriver, who have been supervising this boy's diabetic management during the past five years.

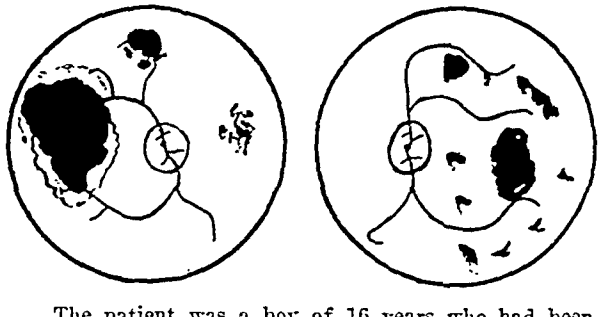
CENTRAL RETINOCHOROIDITIS IN CONGENITAL SYPHILIS

BY BENJ. H. HARRY, M.D.

Oculist to British Columbia Mental Hospitals, Vancouver

According to the literature as expressed by the abstracts of the *American Journal of Ophthalmolgy*, the above mentioned condition is rather rare. The following case is submitted as it appears to fit into this category.

O.D. Ophthalmoscopic O.S.



The patient was a boy of 16 years who had been blind to a great extent for ten years. He had perception of moving objects only in the periphery of each field; central vision was totally absent. Hutchison's teeth were present. The frontal bones showed marked bossing; speech was very defective, and there was spasticity of the right leg. His Wassermann test was plus four, and his mentality had been arrested since

infancy. He gave a history of some form of meningeal reaction at the age of six weeks.

Right eye-ground.—The disc was of a chalky whiteness, with the disc arteries absent. At 12 o'clock there was a patch of choroiditis with spots of pigmentation. There was another such patch at 2 o'clock. The main lesion was a large charcoal-coloured patch measuring horizontally three disc diameters and vertically about four disc diameters. It was irregular in contour and bordered by a zone of sclerotic tissue.

Left eye-ground.—The pathological appearance here is essentially the same, with the exception that the central and main patch extends from the macular area downwards, and the general fundus shows a more general and finer deposits of pigment with more obscuration of the choroidal details.

Clinical and Laboratory Notes

REPAIR OF SECONDARY TRAUMATIC DEFECTS IN LIP MUCOUS MEMBRANE

By Stuart Gordon

Toronto General Hospital, Toronto

Misplaced portions of lip mucous membrane, the result of lacerations or operations, are not uncommon, and offer a rather troublesome little problem in treatment. The disfigurement resulting from this apparent redundancy of lip mucous membrane is often marked, and always obvious. Reconstruction is difficult, the problem being to remove just enough mucous membrane to eliminate the defect. Removal of more than necessary lessens the fullness of the lip. This produces an ugly disfigurement. Insufficient removal, on the other hand, leaves some modicum of the original deformity and pleases neither surgeon nor patient, and another excision is necessary to complete the repair.

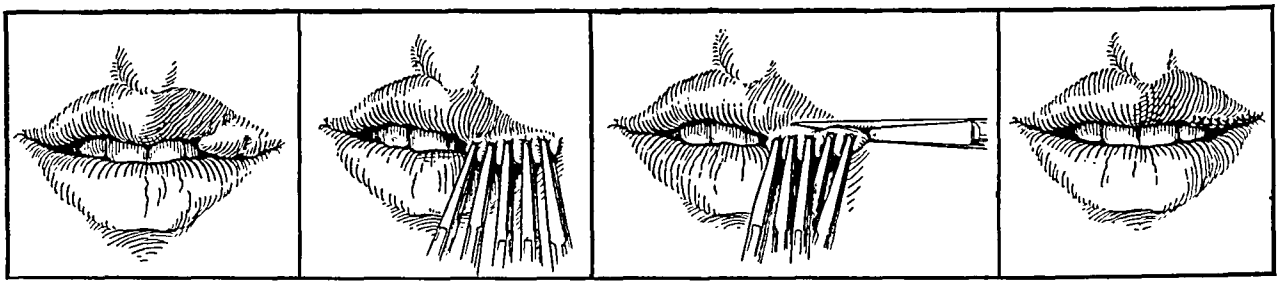


Fig. 1 Fig. 2 Fig. 3 Fig. 4

In an effort to overcome the element of conjecture in the repair of these defects the following technique has been adopted.

The most prominent point of the deformity is picked up with a snap. A second snap is placed close to the first, but includes the estimated depth of the tissue to be removed. Snaps are then put on in order, including less and less depth of tissue as they get farther and farther from the first one. The same procedure is then carried out on the opposite side of the original snap. A fairly accurate judgment can now be made as to whether or not sufficient tissue has been marked out for excision. The tendency is to take too little rather than too much. If an insufficient amount is thus marked out the snaps are loosened and reapplied to include more tissue. Finally, the first snap is loosened and applied to include the full depth. Once it is decided that the correct amount has been defined, the mucous membrane is removed with scissors, the line of division being at the points of the snaps. The line of division should, as far as possible, be placed on the back of the lip and thus hidden. The mucous membrane edges are approximated with interrupted fine catgut sutures.

It is important that nerve block anæsthesia be used. Infiltration of the area with the anæsthetizing solution makes the problem of adequate removal difficult — practically impossible — and therefore should never be used in this type of case. Fortunately, an infra-orbital block is a simple procedure, and will allow surgical procedures to be done on the upper lip painlessly. If necessary a bilateral block can be done. For the lower lip a mental nerve block suffices.

This technique has proved satisfactory. Since its adoption no secondary operations have been required, and no residual deformities left to disappoint.

Editorial

INDICATIONS AND CONTRA-INDICATIONS FOR OPERATION IN CORONARY OCCLUSION

IN view of the fact that, under suitable circumstances and given a sufficiency of time, the heart has no inconsiderable power of developing new vascular anastomoses in cases where the coronary arteries are obstructed it becomes a matter of practical importance to enquire whether we can aid in this natural process of defense. This question can now be answered in the affirmative. It can be taken as settled, on the basis of experimental, clinical, and post-mortem evidence, that surgical measures have a place, even if but a limited place, in the treatment of coronary occlusion. The work of Beck, Tichy, and Feil,[1,3] in the United States, and of O'Shaughnessy,[2] in England, is sufficient proof of the truth of this statement. The American authorities endeavour to provide for the formation of anastomoses by grafting pectoral muscle and vascularized fat from the mediastinum and subcutaneous tissues on the surface of the heart; experimentally, they have also used the great omentum. O'Shaughnessy uses a graft from the great omentum. In both types of operation the results have been good.

Feil and Beck[3] report a series of 25 patients operated upon, of whom 13 were observed for periods of five months or longer. Of the twenty-five 16 were living at the time of their publication and 9 were dead. Eight of the deaths occurred within one week of operation. Beck's original operation has been considerably modified and the improvement in technique is reflected in his mortality statistics. It is important to note that while the mortality rate in the first 12 cases was 50 per cent in the last 13 it was reduced to 15.4 per cent; in the case of the last 9 there was no mortality. O'Shaughnessy[4] reports 6 cases in which he performed his operation of cardio-omentopexy. One patient died a week after from a cause unrelated to coronary disease—hæmorrhage from a duodenal ulcer; the others were apparently benefited. Neither series of cases is extensive but the results are encouraging.

Feil and Beck (*loc. cit.*) suggest three possibilities to explain the good effect of operation: (1) an actual increase in the supply of arterial blood to the myocardium; (2) a redistribution of the blood that passes through the coronary arteries owing to the establishment of new intercoronary communications; and (3) the interruption of nerve pathways from the heart. O'Shaughnessy is less detailed, but states that the graft fulfils the immediate function of supplementing the blood-supply to that portion of the myocardium still capable of activity, that it prevents further necrosis of any area so ischæmic as to have lost its active function, and that it should in some measure act as an insurance against any further obliteration of the coronary tree.

The indications and contra-indications for operative interference in coronary disease cannot as yet be rigidly defined. It is obvious, of course, that the results to be obtained will depend in a general way, first, on a judicious selection of the cases, and, secondly, on the nature of the operation performed. O'Shaughnessy (*loc. cit.*) demands unequivocal evidence of cardiac ischæmia, and must be satisfied that the immediate risks from the operation are less than the patient must in any event run if his disease pursued its natural course. Feil and Beck lay down the following criteria: (1) unequivocal evidence of coronary sclerosis; (2) inability to get along on medical treatment, drugs and rest, with any degree of comfort; and (3) absence of

1. BECK, C. S. AND TICHY, V. L.: The production of collateral circulation to the heart, *Am. Heart J.*, 1935, **10**: 849 and 874.
2. O'SHAUGHNESSY, L.: Experimental methods of providing a collateral circulation to the heart, *Brit. J. Surg.*, 1936, **23**: 665.
3. FEIL, H. AND BECK, C. S.: Treatment of coronary sclerosis by producing a new blood supply, *J. Am. M. Ass.*, 1937, **109**: 1781.
4. O'SHAUGHNESSY, L.: Surgical treatment of cardiac ischæmia, *The Lancet*, 1937, **1**: 185.

circulatory failure. Hypertension is not a contra-indication, nor is diabetes when properly controlled.

In the selection of suitable persons to undergo these operations one would naturally exclude those who would ordinarily be considered bad surgical risks. Yet, O'Shaughnessy remarks that at the Lambeth Cardio-vascular Clinic they have established that cardio-omentopexy can be performed without immediate disturbance even in a type of patient ill-suited to most surgical procedures, and Feil and Beck do not believe, even though the patients are bad risks for any operation, that the mortality in the future will be high for their operation on the heart. This seems to be a happy augury and speaks well for the judgment of these authorities in the selection of their cases and for their operative skill. Shou'd it prove, with greater experience, that these operations are attended by a low mortality it may well be that the range of their applicability will be extended.

Patients suffering from coronary occlusion may be divided into four groups: (1) those who die instantly or within a very few hours from the initiation of the attack; (2) those who survive for the time-being, but succumb in a few days or weeks from heart failure; (3) those who have recurring attacks, but yet survive many months or years; and (4) those who never have a second attack. According to some authorities group three comprises almost 80 per cent of the cases. It is in this group that the operations of Beck and O'Shaughnessy find their field of usefulness. One may properly enquire, however, in view of the low mortality associated with them, whether Feil and Beck's second criterion, as given above, may be not unnecessarily severe. Perhaps it may eventually be found justifiable to operate in more cases of group three or the potential group three, that is, to operate as soon as it is evident that the patients have made a satisfactory recovery. Most of them are going to have other attacks later, which may prove fatal or seriously incapacitating, so why wait until the powers of recuperation are further handicapped? Early operation would seem preferable to late operation, and in the end would prove life-saving for a greater number of patients. O'Shaughnessy's second requirement, as given above, is more elastic, and, in our judgment, at least, would seem a better guide. With accumulated experience, no doubt the indications for operation will be more exactly apprehended. With regard to the type of operation to be adopted, time will also give a lead. Naturally, the simplest operation, that attended with the least shock, and that causing the least disruption of the tissues would seem the most desirable. O'Shaughnessy prefers his own operation of cardio-omentopexy for the reasons that he does not feel that the factors producing post-operative shock can be so well controlled in Beck's operation, and in his hands, at least, would be a more serious operation, and that the omentum has obvious advantages over muscle as a vascularizing agent. Both these authorities are at one, however, on the necessity of full co-operation between the physician, surgeon and the specialists in order to determine the suitability or otherwise of any given patient for treatment by surgical measures. For fuller details as to the selection of cases and the prognosis the reader is referred to a recent article by Davies, Mansell and O'Shaughnessy.[5] A.G.N.

5. DAVIES, D. T., MANSELL, H. E. AND O'SHAUGHNESSY, L.: Surgical treatment of angina pectoris and allied conditions, *The Lancet*, 1938, **1**: 1 and 76.

THE OSSIFICATION AND MATURATION OF BONE

OF all uninteresting anatomical facts perhaps the most burdensome are ossification dates. These dates have, however, many clinical as well as medico-legal applications, and generations of students therefore learned figures dogmatically stated, but derived from a few skeletons and subsequently proved erroneous (Todd[1]). Nowadays the statements, made with equal dogmatism, are commonly based on radiographs of living subjects with no apparent bone disease, and yet discrepancies, sometimes of several years, are found between these average dates and the results of observations by Professor Wingate Todd and his assistants at Western Reserve University (observations extending over fifteen years), involving a quarter of a

1. TODD, T. W.: The anatomical features of epiphyseal union, *Child Development*, 1930, **1**: 186.

million radiographs on more than four thousand children with detailed health records, all the radiographic interpretations being based on the dissection and radiography of the bodies of four hundred children. In all respects the observations that underlie current textbook statements are unsatisfactory. For example, trivial illnesses affect ossification (Todd,[1] Harris[2]), and Todd[3] has shown that in children in a good environment, especially with proper food, bony epiphyses unite with the shafts a year or more earlier than do the epiphyses of children in an average environment. Poor children lag still farther behind. Such facts, rather than racial differences, account for the differences between British and American observations.

Since nutrition is so influential, ossification dates can never be final or universal, but one thing is clear, that the badly established statements in anatomical and radiological books must be disregarded. It is not only simpler but more scientific to group ossification dates into broad age-periods—Fetal, Infantile, Puberty and Adolescence (Whitnall[4]). For details the best data are those of Todd,[3] to which a further contribution is soon to be made (Todd).

Professor Todd's investigations go far beyond ossification dates—into the maturation of bone. It is a commonplace that a child may be tall but not correspondingly mature in body, and yet the fact that size does not indicate maturity seems to have been forgotten by workers who are still trying to measure maturation by the increase in area of epiphyses or carpal bones. The dates when ossification centres appear are not reliable indicators of maturation, because they depend on the availability of mineral matter, on the readiness of cartilage to ossify, and, therefore, on the supply of vitamin D.

Skeletal maturation is indicated by the progressive changes in shape and structure of bony epiphyses, carpals and tarsals; and later, when epiphyses are about to fuse with shafts, by the degree and mode of penetration of bone into cartilaginous epiphyseal plates. Standards have been selected typical of the stage reached every three months in the first year and every six months thereafter until epiphyseal union is complete. The sequence of stages is the same whether the child matures more, or less, quickly than did those who provided the standards. The method and standards have been previously described (see especially Todd[3]), and, after thorough testing on large groups, an atlas (Todd[5]) of very clear standard radiographs of male and female hands has been issued, with full descriptions and explanations, so that assessment of any adequately made radiograph presents little difficulty. Atlases of other epiphyseal regions are to follow.

That skeletal maturation is a valid indicator of physical maturation in general is perhaps best illustrated by reference to menstruation. Most girls menstruate first at one particular stage of skeletal maturation (Todd[3]), although their actual ages vary greatly.

These investigations have wide practical applications. All who are concerned with children's health must be interested in such questions as whether a certain undersized child is correspondingly physically immature, or whether another child's emotional or moral difficulties arise from his being more "grown up" physically than the average child of his age and experience. In treating delayed growth and development, for example by thyroid and pituitary substances (Zuck[6]), repeated observations of skeletal maturation are practically essential.

To one who has followed Professor Todd's work in detail it is regrettable to note how little it has been appreciated by British anatomists, and it is interesting to learn that in at least one Canadian medical school the anatomy department has continued to teach the information on ossification criticized above, while the department of pædiatrics teaches along the lines laid down by

2. HARRIS, H. A.: Bone Growth in Health and Disease, Oxford University Press, 1933.
3. TODD, T. W.: Growth and Development of the Skeleton. White House Conference Report on Growth and Development of the Child, Pt. II.—Anatomy and Physiology, Century Co., New York, 1933.
4. WHITNALL, S. E.: The Study of Anatomy, Arnold, London, 1933. (The age-equivalents of the ossification periods referred to should be modified by reference to Professor Todd's statements.)
5. TODD, T. W.: Atlas of Skeletal Maturation, McAinsh, Toronto, 1937.
6. ZUCK, T. T.: The measurement of aberrant developmental growth, *J. Pediat.*, 1933, 3: 424.

Professor Todd. One reason for this "time-lag" in anatomical teaching is undoubtedly the influence of the days when it was the anatomist's pride to "make dry bones live"—to clothe dead bones with muscles and other structures equally dead, instead of teaching that bones are intensely alive. Another reason for the neglect of Professor Todd's work appears to be that such costly investigation must justify itself, and secure further financial support, by frequent popular or semi-popular reports with little detailed evidence, thus creating a misleading impression of its soundness. The newly published atlas leaves no room for such neglect or criticism.

DONALD MAINLAND.

Editorial Comments

The Qualifications of Laboratory Technicians

One of the difficulties faced by our hospitals and their staffs in the selection of laboratory technicians is the lack of an adequate yardstick for measuring their qualifications. Not that certain standards of qualification do not now exist, but such have not as yet been sufficiently utilized by either the would-be employers or the technicians to give them authoritative and widespread recognition. The situation is particularly difficult in the smaller centres, for such institutions frequently must pick their technicians from afar and have considerable difficulty in evaluating the capability of the applicants by correspondence.

At the present time there is a young Canadian organization which already has enrolled over 200 members. This is the incorporated Canadian Society for Laboratory Technologists, with headquarters in Hamilton, Ont. Members must have honour matriculation standing, have had at least one year of medical laboratory experience, and have satisfactorily passed an oral and written examination set by an examining board of clinical pathologists and members of the Society. Prior to January of this year admission was without examination and upon the recommendation of two pathologists.

For some years a number of technicians in Canada have been members of the Registry of Medical Technologists of the American Society of Clinical Pathologists, with headquarters in Denver, Col. Membership requirements in this body have been stiffened recently, it being essential to have had two years' college instruction with credits in chemistry, biology, bacteriology and physics, and to have had either twelve months' instruction in an approved training school for technicians or an apprenticeship for at least a year under a qualified clinical pathologist. Graduation from an accredited training school for nurses is not now taken as an equivalent for the college course. Registrants are known as Laboratory Technicians (L.T.), or, if a complete university training in medical technology or equivalent be obtained and the applicant be recognized for outstanding research or other service, the title of Medical Technologist (M.T.) may be granted.

Unfortunately the majority of technicians are not as yet members of either body. Many have not had the educational background or training required, and a large number, including many who have proved very competent, have simply picked up their knowledge by the apprenticeship method. One primary reason may have been that, with a very few much appreciated exceptions, organized courses of instruction have not been developed by our hospital and other laboratories. Also we have no machinery at present for the approval of schools for laboratory technicians in Canada. Under such conditions many technicians are undertaking exacting scientific tests for which they are not adequately trained, and really well-trained technicians often find it difficult to obtain employment.

In an effort to develop some solution of this situation a special committee of the Canadian Medical Association under the Chairmanship of Dr. William Deadman, of Hamilton, has been giving thought to the advisability of encouraging the development of schools for technicians in selected laboratories, and of formulating standards for accrediting such departments, such as is now undertaken by the American Medical Association. The suggestion has been made also that there be set up in Canada a registry of qualified technicians, having in mind the varying requirements of large and small institutions. The recommendations of this committee will be awaited with interest.

HARVEY AGNEW

The Journal of Neurophysiology

We note the addition of a new journal to the long list of medical publications. This is entitled the *Journal of Neurophysiology*,* with an editorial board of Drs. J. G. D. de Barenne, J. F. Fulton and R. W. Gerard, and an extensive advisory board. The primary aim of this Journal is to provide a channel for *prompt*

* Published bimonthly by C. C. Thomas, Springfield, Ill.

publication of original work bearing on the functions of the nervous system. It will not however include morphology or neuropathology, and clinical, zoological or psychological contributions will only be considered when they are primarily experimental in character.

The format and printing are excellent. The articles are not long and the illustrations are adequate. The *Journal of Neurophysiology* should be of value in recording the most recent experimental work in this field. H.E.M.

The Cultural Reproduction of Chromidial Granules in Malignant Neoplasms

Attention is directed to an article by Dr. O. C. Gruner on the above subject which can be found on page 389 of this issue. This article deals with the important and absorbing subject of the presence of micro-parasitic organisms in cancer tissue, and brings out some new observations which form a link in the chain of evidence being welded at the present time. A.G.N.

Special Articles

DIET AND NUTRITION

PROTEIN REQUIREMENTS IN NORMAL NUTRITION*

BY LENNOX G. BELL, M.D., M.R.C.P.(LOND.)

Winnipeg

II.

The protein requirement in the normal diet is a subject upon which a wide difference of opinion exists, and many of the ideas are so much at variance with the known facts that these requirements should be emphasized in any discussion of normal nutrition.

In prescribing normal diets the relative proportions of fat and carbohydrate may be varied within wide limits so long as the total caloric requirements are met. In the case of protein, however, the optimum requirements cannot be supplied so simply. Protein plays a fundamental rôle in the body. Primarily, it supplies the necessary amino-acids for growth and repair of tissues, and for the manufacture of certain secretions, antigens, hormones, antibodies, enzymes, etc. In the second place, protein may be used to furnish energy through its deamination and transformation to carbohydrate. A third and perhaps less important function of protein is concerned with the transport of fats and other lipoids in the body.

Proteins are nitrogenous compounds formed of a number of amino-acids which combine in several different ways to form a wide variety of proteins, both animal and vegetable. Some twenty-two amino-acids occur in varying amounts in animal and vegetable proteins. It has been established that whereas certain simple amino-acids like glycine and alanine can be synthesized in the body others must be supplied in the diet if normal health and growth are to be maintained. There is experimental evidence to indicate that ten amino-acids cannot be synthesized by the higher vertebrates. Certain proteins such as lactalbumin of milk, beef protein, ovalbumin of eggs, glutenin of wheat, contain all the essential amino-acids, and since in the average mixed diet some or all these are supplied, only in the case of freak vegetable diets will actual qualitative deficiency arise.

The reserve or deposit protein amounts in the adult human body to approximately 2 kg. Though its fuel value is only 8,000 calories, about sufficient to maintain life at a basal level for five days, nevertheless, with its associated water (10 kg.), it forms a considerable part of the non-skeletal structure of the body. But, though available as reserve fuel in case of necessity, this protein probably serves the more important protective purpose of maintaining the stock of materials available to replace the wear and tear on vital organs such as the heart, thereby avoiding the destruction of less essential living protoplasm to protect them. It is associated with the state of turgor of tissues and, in general terms, with the sense of fitness of the body, with the power of resistance to infections, etc. In fever, starvation and wasting disease it falls to a low value, but is present in excess in myxœdematous states. It should be noted that in children not only is the reserve smaller but the rate of metabolism is higher, hence the more rapid wastage of the body as compared with adults when afflicted with the same disease.

When sufficient calories are otherwise provided muscle-activity has little effect on the protein requirement. Only when the calories are inadequate is protein called upon to supply the deficiency. During fasting most of the energy required for muscle work is derived from fat, only 3 per cent being obtained by breaking down protein. The notion, frequently encountered, that a high protein diet is essential for heavy work is fallacious, and, indeed, in temperate weather actually mischievous, since the

* This article is the second in a series on the Nutritional Requirements of the Normal Person. The series is being prepared by a number of authors acting in cooperation with the Committee on Nutrition of the Canadian Medical Association.—EDITOR.

The first article can be found in the *Journal*, 1938, 38: 277.

high specific dynamic action of the metabolizing protein causes conversion of considerable amounts of energy directly into unnecessary heat which must be dissipated. By contrast, the specific dynamic action of burning fat and carbohydrate is small. During exposure to cold weather the increased heat production induced by protein metabolism may be useful when the total energy requirement for work is small, but in the heavier outdoor occupations it is unnecessarily wasteful.

Every normal diet must include a certain quantity of proteins of sufficient variety to supply all the necessary amino-acids. Protein rich foods are enormously more expensive than carbohydrate foods; hence the economic factor enters into the question in planning normal diets. It is of considerable importance to know as accurately as possible what are the protein requirements of the normal diet. Carl Voit, in 1881, using the statistical method of studying normal diets, established the average protein intake as 118 grams daily. Professor Chittenden at Yale, in 1904, using as subjects active soldiers and athletes, was able to maintain nitrogenous equilibrium on diets containing 40 grams of protein. Today it is generally accepted that about *60 grams of protein, or, roughly, 1 gram per kilogram of body weight, represents an adequate protein intake,* and 1.25 to 1.5 grams per kilogram is commonly used in middle-class dietaries. For growth and the higher rate of metabolism of children larger allowances must be made.

During the war many observations were made in Central Europe on large groups of people who were receiving insufficient food. Many cases of anæmia and hunger œdema due to lowering of the blood proteins were studied. Yet it was observed by Muller that the protein deficiency symptoms entirely disappeared if ade-

TABLE I.

Source of protein	*Raw or cooked*	*Average serving*	*Protein in serving*	*Grade of protein*	*Fat*	*CHO*	*Calories in serving*	*Calories per pound*
		oz.	*gram*		*percentage*	*percentage*		
Beef, roast	C	2½	17.0	A	28.0	..	257	1,512
boiled	C	3	22.5	A	23.0	..	276	1,380
corned	C	3	24.0	A	19.0	..	247	1,235
small sirloin	C	5	36.0	A	10.0	..	279	837
tongue	C	1½	8.5	A	23.0	..	127	1,270
Veal, roast leg	C	3	25.0	A	1.0	..	109	545
cutlet	C	4	24.0	A	7.0	..	171	641
Bacon, side	C	1½	6.8	A	40.0	..	189	1,890
back	C	1½	9.9	A	33.0	..	173	1,732
Ham	C	2	13.2	A	33.0	..	231	1,732
Pork, roast leg	C	2½	21.0	A	10.0	..	151	909
chop, lean	C	2½	20.0	A	6.0	..	119	711
Lamb, roast leg	C	2½	15.0	A	13.0	..	147	827
chop	C	2½	13.8	A	26.7	..	235	1,408
Chicken, roast	C	3	22.5	A	5.0	..	130	612
Turkey, roast	C	2½	20.9	A	18.4	..	210	1,295
Salmon, boiled	C	3+	19.6	A	7.5	..	146	680
Halibut, boiled	C	3+	21.4	A	4.0	..	120	540
Mackerel, boiled	C	3+	23.7	A	6.5	..	153	688
Trout, lake	C	3+	18.0	A	10.0	..	162	729
Oysters	R	3+	6.0	A	1.0	3.0	45	202
Eggs, two	R	3	12.0	A	6.0	..	156	780
Milk	R	10	9.0	A	4.0	5.0	204	306
Cream, table	R	5	4.0	A	16.0	3.8	255	850
whipping	R	5	3.0	A	32.0	3.8	451	1,503
Cheese, domestic	R	2/3	5.6	A	38.0	..	91	1,943
Ice cream	R	3+	5.2	A	10.0	18.0	189	850
Bread, wheat	C	2	5.4	B	1.0	55.0	160	1,192
rye and wheat	C	2	7.2	B	..	52.0	160	1.190
Oatmeal, boiled	C	3+	2.8	B	0.5	11.5	61	274
Shredded Wheat, one	C	1	3.0	B	0.4	75.0	109	1,744
Puffed rice	C	½	0.9	B	..	80.0	54	1,575
Cornflakes	C	2/3	1.1	C	1.5	81.0	72	1,640
Macaroni	C	3+	3.0	B	1.5	15.8	91	410
Peas, green	C	3	6.0	B	3.0	13.5	110	536
Beans, canned, baked	C	4	8.0	B	3.0	22.0	173	649
Corn, canned, green	C	3+	2.8	C	1.2	19.0	101	455
Calf's foot jelly	C	2	2.5	C	..	9.0	54	89
Jellied meats	C	3	13.0	AC	2.5	..	74	370
Meat and vegetable stew	C	5	7.5	AC	5.0	5.0	127	381

NOTE: + equals less than half an ounce, *i.e.*: 3+ equals 100 grams.
Grade A proteins, excellent replacement and growth value.
Grade B proteins, good supplementary protein.
Grade C proteins, incomplete: never to be used as the major protein of the dietary.

quate carbohydrate was added to the diet. These observations illustrate the protein-sparing action of carbohydrate, later confirmed experimentally, among others, by Rubner, who was able to maintain nitrogenous equilibrium on 33 grams of protein as long as the total calories equalled 2,000 daily. This protein-sparing action is not possessed by fats when fed alone, though fat and carbohydrate mixtures function fully as well as carbohydrate alone.

The problem of protein malnutrition is not encountered only during war and famine. Practitioners meet it daily among poor and ignorant people, and perhaps almost as frequently among the opinionated and ignorant followers of some dietary faddist or commercialized diet racketeer. Suffice it to say, then, that problems of protein nutrition will arise under conditions causing an insufficient intake or inadequate absorption of the protein or other foods, whenever the protein loss is abnormally large or there is reason to suspect that increased destruction of protein is taking place, or whenever the body is unable to replace the broken-down protein with sufficient speed.

It will be readily apparent that the protein intake for normal nutrition and growth will vary with the age of the individual as well as with his size. Holt and Fales suggest 4 grams of protein per kilogram body weight up to one year of age, the requirement diminishing gradually, until at six years 2.6 grams per kilogram body weight is sufficient. The requirement may be more simply expressed as that protein contained in 2 ounces of milk (1.8 grams protein) for the first year, and thereafter 1.5 ounces of milk for each pound of normal body weight. Indeed this standard might be accepted as providing sufficient protein up to twelve, even fifteen years of age, when the requirements for growth diminish. During adolescence 0.9 ounces of milk should be adequate and 0.8 ounces thereafter would provide liberal protein for the adult.

Milk, however, as a permanent diet has many obvious disadvantages which these calculations have for the moment ignored. It should furnish 100 per cent of the protein for the first four months of life and 90 per cent of the protein for the remainder of the first year. For the next seventeen years, 30 ounces of milk (27 grams protein) should be supplied, and thereafter a minimum of 10 ounces of milk daily is desirable. This includes the amounts used in cooking. The remaining protein may be obtained from other sources, but up to six years of age the diet should contain at least two-thirds of its protein in the form of Grade A protein (meat, eggs, fish, fowl and dairy products). Thereafter, from 35 to 50 per cent of the protein intake should be Grade A, the remainder being derived from as wide a variety of sources as possible.

From the Table it is simple to ascertain the approximate protein sufficiency of a diet. Thus one serving each of milk, eggs, and roast beef, with three servings of bread, contain 1,100 calories and 54 grams protein, four-fifths the protein requirement of the average man, and over 70 per cent of it is Grade A protein.

THE CULTURAL REPRODUCTION OF CHROMIDIAL GRANULES IN MALIGNANT NEOPLASMS*

BY O. C. GRUNER, M.D.

Research Fellow, McGill University, Montreal

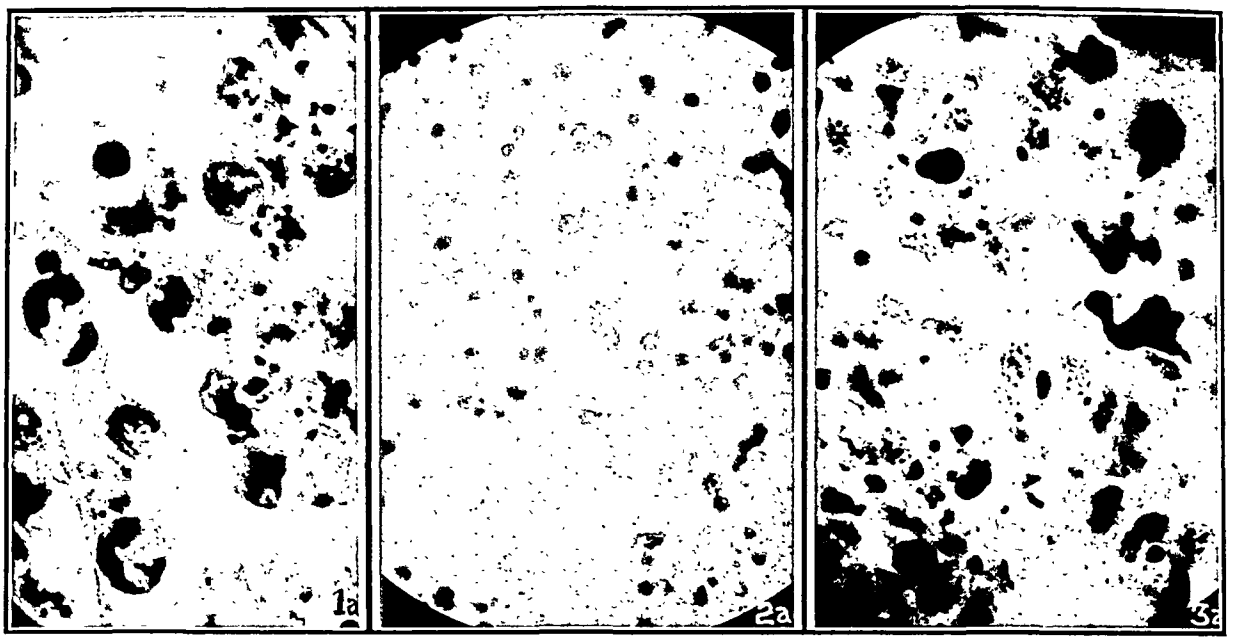
In a previous communication (*Canad. M. Ass. J.*, 1937, 36: 31) a description was given of the various types of granulation met with in the tissues of sarcomas and carcinomas as providing a basis upon which the structure of neoplasms could be correlated with clinical phenomena. It was suggested that such granulations should be assigned a major place in the process of neoplasia. Critical evidence in favour of such a theory would be to hand if it were possible to obtain such bodies in culture in a cell-free medium, for then the usual view that they are simply degeneration-products of nuclear breakdown would be set aside.

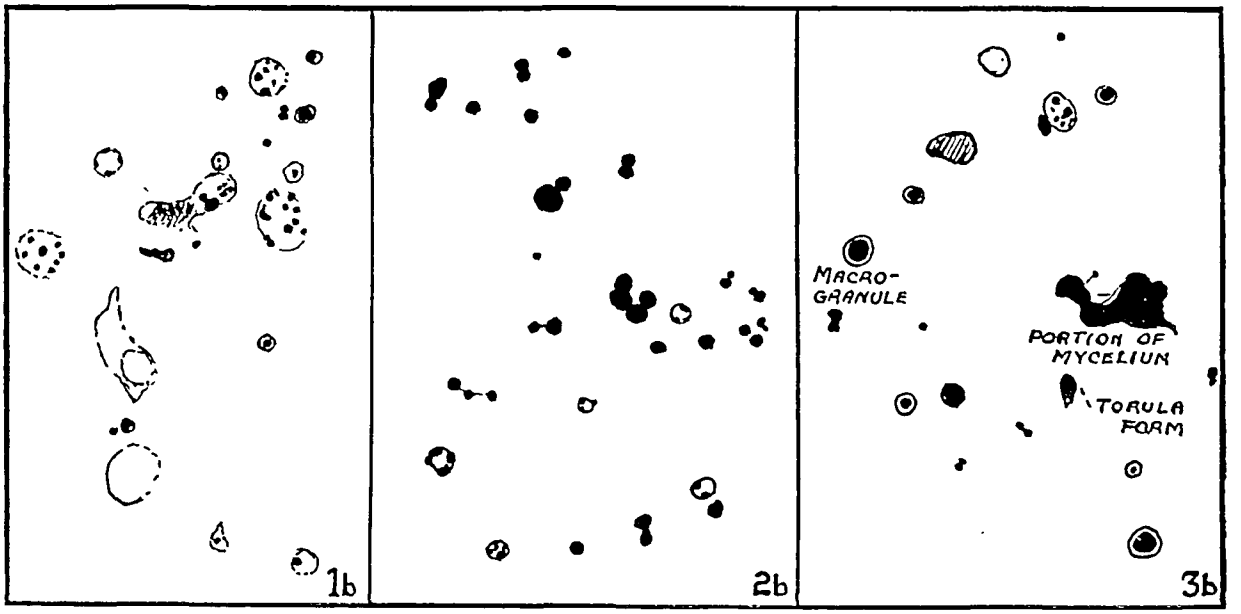
The study of over-living carcinoma tissue fresh from the operating room, either by the dark-field method or by the Zeiss polychromar, shows granules varying in size from that of "elementary bodies" upwards. Blood-cultures and cultures from the tissue also show the most minute bodies, but usually fail to demonstrate those of the kind found in the (so-called) necrotic parts of tumour tissue as shown in Fig. 1a (oil immersion view of the lumen of an acinus in a human adenocarcinoma). Fig. 1b interprets which granules are referred to.

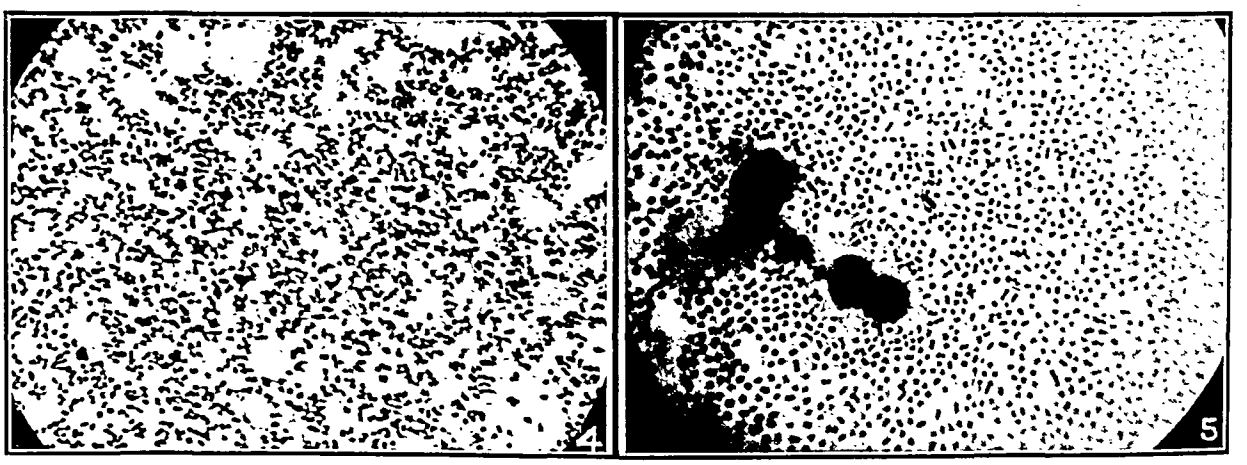
The accompanying photographs are from cultures in which multiplication of various kinds of these bodies has taken place. Fig. 2a shows those isolated, and multiplying in a 16-day old blood-culture on tomato-broth, taken from a case of carcinoma of the thyroid during the operation. The irregular shadowing of the larger bodies is barely visible in the photograph, for which reason a companion sketch is placed against it (Fig. 2b). The budding forms are however easily made out. This is stained as for elementary bodies (carbol-fuchsin).

Fig. 3a presents an oil-immersion view of a section from mouse-sarcoma (strain dbrB from

* This work was made possible by a grant from the Archibald Cancer Research Fund, McGill University. The paper was received for publication on February 12, 1938.


1a
2a
3a


1b
2b
MACRO-
GRANULE
PORTION OF
MYCELIUM
TORULA
FORM
3b


4
5

Bar Harbour) showing several types of granulation in one field. The largest irregular mass is fungoid in character. (Gram-positive; red with safranin). The unstained over-living tissue was choked with minute granules, which were also obtained in pure culture as shown in Figs. 4 and 5, the magnification being 1,800 diameters, so that the granules are much smaller than the usual micrococci.

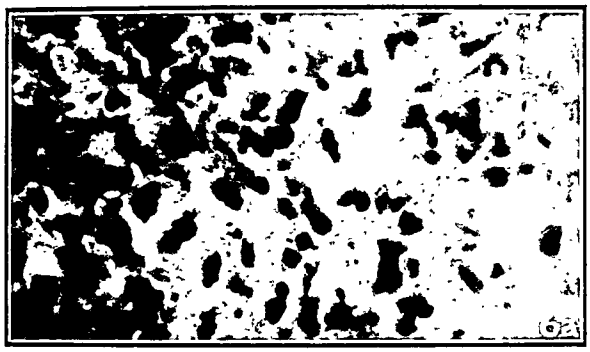


Fig. 6a

The view that chromidial granules are sometimes of exogenic origin (that is to say, are infective in nature) is also supported by the specimen shown in Fig. 6a, which shows a lesion in the liver of a rat which had been inoculated with a cryptomyces isolated from a case of human gastric carcinoma. Typical short fungal hyphæ are evident, besides the sharply defined round granules of various sizes. (Panchrom. stain; oil-immersion view). Budding forms are also numerous.

The different cultures show a pleomorphism recalling that emphasized in the cryptomyces originally reported.

To sum up, evidence is presented to show that the chromidial granules of various kinds which

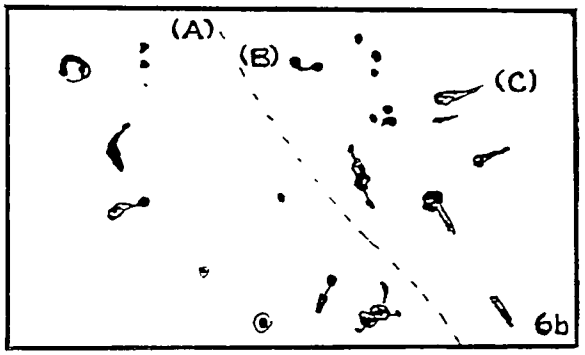


Fig. 6b.—A. edge of liver tissue; B. edge of lesion; C. fragments of hyphæ.

form a feature of most malignant neoplasms, both in the necrotic and non-necrotic parts, are not all degenerative-products but are viable organisms possessing reproductive power. The part which such organisms play in the neoplastic process is another question.

Men and Books

THE EARLY DOCTORS OF SOUTHERN ALBERTA*

By HEBER C. JAMIESON, M.B.

Edmonton

The settlement of Alberta was of so recent a date and took place in various districts under such particular circumstances that its early medical history can be sketched without difficulty. First fur traders in canoes, next missionaries in ox-carts, then the mounted police in the saddle, and later settlers by train played their part in opening up the country.

To the far north in 1776 came the intrepid trader, Peter Pond. Pushing his way beyond the trading posts on the prairie, he reached Lake Athabasca and established the first permanent settlement in the province, Fort Chipewyan. This fort for over a hundred years was the main depot of the fur business for the vast northland. The second centre originated on the North Saskatchewan. Fort Edmonton was built in 1795 to capture the trade from the Rocky Mountains. For nearly three-quarters of a century only the northern and central portions of the province were occupied by the few white men engaged in barter with the Indians.

In 1873 American fur traders, having invaded Alberta from Montana, were becoming a menace to the country by their unfair methods of bargaining and by their corruption of the Indians. These practices became so disturbing that the North-West Mounted Police was formed, sent west, and built forts at Macleod and other strategic points near the border. Their arrival brought peace and harmony to the tribes; settlers soon followed, and the southern ranges became dotted with cattle ranches. When the Canadian Pacific Railway entered the province in 1883 Medicine Hat and Calgary became divisional points and grew in population. Two years later Lethbridge was joined to the main line by a

*A paper presented to the Calgary Medical Association in March, 1936. Other papers by Dr. Jamieson on the early medical history of Alberta can be found in the *Journal*, 1929, **20**: 188; 1933, **29**: 431, and 1937, **37**: 388.

branch and soon became an important town. Then in 1890 Calgary and Edmonton were connected by rail and settlement took place at intervening points.

The medical services followed much in the order of settlement, and with the coming of medical men the need for hospitals developed. The first doctor to practise in Alberta was W. M. Mackay,* who landed at Hudson Bay in 1864, and served as factor and physician to the Company of Gentlemen Adventurers in the great North-West Territories and later in the Peace River country and at Fort Chipewyan. The spread of medical service in southern Alberta can be conveniently divided into two sections: (1) the mounted police period—the seventies; (2) the C.P.R. period—the eighties.

The police period.—When the mounted police force was organized in 1873 there was authorization for one chief surgeon. To this post Dr. George Kittson was appointed on April 3, 1874. Dr. R. Barrington Nevitt became first assistant surgeon.

DR. GEORGE KITTSON

Kittson was the second son of Commodore Kittson, of the Red River of the north, and was born in St. Paul's (later St. Paul), Minnesota, on August 16, 1844. He was a step-grandson of



Fig. 1.—Dr. George Kittson, from a crayon drawing done at St. Paul, Minn., after his retirement from the North-West Mounted Police.

Alexander Henry who established a fur-trading post on the Red River for the North-West Company in 1801 and debauched the Indians with assiduity and success.

* Other reference to Dr. Mackay, with portrait, can be found in this *Journal*, 1937, **37**: 388.

Kittson entered McGill University for the session 1864-65. He gave his residence as Berthier, Quebec, and religion, Church of England. For some unrecorded reason he did not attend the 1867-68 session, thus taking five years to complete what was then a four-years' course. He graduated in 1869. With Nevitt he accompanied the police on their march from Dufferin, Manitoba, across the plains. When the Belly River was reached Surgeon Kittson returned with the main column to Swan River, the place chosen as the future headquarters. Nevitt continued west with the party under Lieut.-Col. Macleod to establish the post at Fort Macleod. The accommodation for the full strength was found insufficient at Swan River, and Kittson returned to Winnipeg and finally to Dufferin, where he remained during the winter of 1874-75. In May or June, 1875, the headquarters moved back to Swan River, and Kittson remained there until August, 1876. In this year he was transferred to Fort Walsh, where he served until 1882, the year of his retirement. During his term at Fort Walsh frequent visits were made to Fort Macleod and other western posts. He was active on general and special services, and it would appear that he fulfilled these duties in addition to acting as chief surgeon. In 1879 the Department of Indian Affairs undertook to pay half of Kittson's salary. This serves to show the extent of his work as a pioneer doctor. It was during his sojourn at Fort Walsh that Sitting Bull and his American Sioux were refugees at Wood Mountain and a continual source of trouble to the Canadian authorities.

There is little record of Kittson's movements while in the West. Perhaps the only references to him are to be found in the diary of Dr. Nevitt. Unfortunately many valuable records of the pioneers have been lost. Dr. Nevitt's diary, with the exception of the last twenty-seven pages, has disappeared. A few excerpts from these are of interest. They show that Kittson was at Macleod.

Under the date, Tuesday, February 12, 1878, one reads: "All my patients doing well. Kittson's mouth is pretty sore. Some more spicules of bone came away this morning". Four days later one finds: "Kittson's face is improving and his strength getting better". Again on the 19th: "Sent in my report for 1877. Kittson engaged in writing his". A month after this: "Kittson had another bad turn while I was away, but has nearly recovered again".

Kittson was able to take a ride with Nevitt four days later. A final entry, under date of April 3rd, shows the departure of the chief surgeon for the Cypress Hills.

Kittson resigned on January 24, 1882, to take up private practice in St. Paul, Minn. He died on May 10, 1884, at the age of 38. The cause of his death was given as apoplexy. After seeing

the fragments of Nevitt's diary it was thought of interest to see what Kittson had to say, since every policeman was required to keep a daily record of his work. After a prolonged search the writer found that Dr. John M. Armstrong, of St. Paul, was interested also. The latter went to a lot of trouble and finally located the diary. Unfortunately it contained nothing of north-west experiences. An extract from Dr. Armstrong's letter is of sufficient interest to be quoted.

"This morning I spoke to a physician here who I found out had seen and read it about three years ago. He stated that it contained nothing about the mounted police or his north-west experiences. This must be so as he did not know that Dr. Kittson was ever connected with the mounted police.

"He stated that the scene of the diary is located mostly in Philadelphia, and describes his endeavours to discontinue the use of morphine to which he was addicted.

"This morning I went to the cemetery and noted the inscription on his tombstone, read as follows:

JOHN G. KITTSON
DIED MAY 6TH 1884
AGED 40 YEARS.

"In order to verify it I looked up his death certificate (he died here) in the Health Department, and to my surprise the two did not agree. The death certificate gives his age as 38 years and the date of his death as May 10, 1884, cause—apoplexy. Born in the United States and single.

"As a matter of fact he committed suicide by taking a large dose of morphine. He was probably born at his father's trading post near Ft. Snelling.

"Dr. Kittson was a son of Norman W. Kittson's first wife and had no Indian blood."



Fig. 2

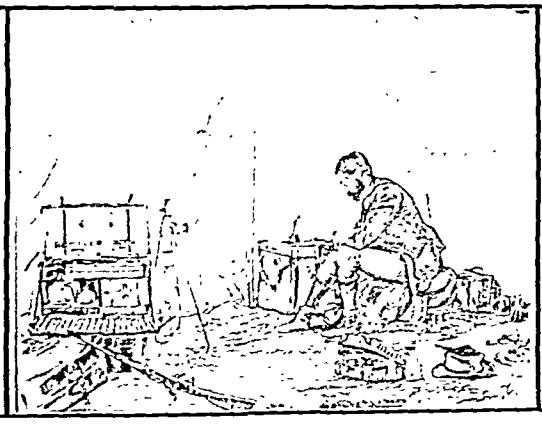


Fig. 3



Fig. 4

Fig. 2.—Colonel Macleod (hand on saddle), Dr. George Kittson on his left, Alfred Wilson holding the horse. Officer with back to camera not known. Fig. 3.—Richard Barrington Nevitt, N.W.M.P., 1874. On trek. Fig. 4.—Dr. George Allan Kennedy.

DR. RICHARD BARRINGTON NEVITT

Of the first assistant surgeon there is more information. Richard Barrington Nevitt (Fig. 3) was born in Savannah, Ga., on November 22, 1850. At fifteen the Civil War was disrupting the social and educational life of the South, and young Nevitt came to Bishop's College, Lennoxville, Quebec. From this school in 1868 he matriculated in the University of Trinity College, Toronto. Here he met William Osler who had just arrived. He said that Osler "brought no marked reputation except that he was a good fellow and held the distance record for throwing a cricket ball". He also wrote: "One afternoon I had an engagement with W.O. and called for him at Bovill's office. The room was large and bare with a few chairs and a small deal table—like a kitchen table. Osler opened the drawer of the table—Dr. Bovill had gone out—and said: "Look here! This drawer has been filled to overflowing with bills two or three times this afternoon, and now look! One solitary bill lay in the drawer. As the patients paid their fees Osler placed them in a drawer. A needy patient came along, and Dr. Bovill reversed the process and handed money out so that the sick man might get his medicine and the food and other things required."

In 1871 Nevitt received his B.A., his M.B. in 1874. Eight years later, 1882, he returned to acquire his M.D. While at the University he joined the H.C. Queen's Own (Trinity), and thus became a Canadian citizen. Before graduation he lived in the Toronto General Hospital, first as a dresser and later as an assistant apothecary. Finally he acted as a house surgeon. Nevitt and Kittson acompanied the Six Troop of the police across the prairies in the summer and autumn of 1874. When Kittson turned back, Nevitt continued on past the Belly River with the party under Col. Macleod. At the fort named after the latter he remained until his retirement in 1878. His chief concern was with the mounted police but he ministered to the surgical needs of the few whites and breeds in the vicinity and the odd Indian, as will be seen.

With the construction of the original barracks a building was set aside as a hospital. No provision was made for a staff, so the custom de-

veloped of using the services of a regular member of the force as a dispenser, to be in charge of the drug supply, and in various ways to assist the surgeon. These men became known as hospital stewards, or according to rank—hospital sergeants. It was not until surgeon Jukes received the post of senior surgeon in 1882 that the practice of appointing a number of fully qualified pharmacists as hospital stewards, with the rank of sergeant, was inaugurated. In the same way a number of medical men were engaged as regular members of the force, and were given the non-commissioned rank of staff-sergeants. From the earliest days of the policing of the plains it was the custom for civilian patients to be treated in the police hospitals, since no other accommodation was available. This practice continued in some districts until the nineties.

The Macleod Hospital (Fig. 5), constructed in 1874, was the first in Alberta. In 1875 Fort Walsh had one. Other western posts followed: Qu'Appelle in 1881, Calgary in 1882, Regina in 1883, Maple Creek in the same year. Battleford and Prince Albert had hospitals in 1884.



Fig. 5.—North West Mounted Police Hospital at Macleod. Braithwaite was a patient there in 1887 with typhoid fever.

Lethbridge in 1886 had a mine hospital which was open to the police. Three years later they constructed their own hospital there.

Nevitt during his stay at Macleod recorded observations on the weather, movements of the force, and comments on amateur dramatic performances. Little of medical interest appears—an occasional complaint about his drugs being delayed in transit from Fort Benton, Montana Territory. Unfortunately most of his journal is lost. Only that part from November 23, 1877, until the fall of 1878 is in existence.

In December, 1877, Crowfoot, a famous Indian chief, was a patient. A short time after this he writes: "I operated upon Kennedy's woman in Jerry Pott's house this afternoon and removed a large piece of dead bone from the humerus near the head". On February 25th he writes: "A train is to go to Calgary tomorrow and is willing to carry a little freight". The next day: "The man Sproule took a box of drugs for me to Lauder. This about completes his list. I packed up Herchmer's medicines. They are now ready awaiting shipment." From another item it would appear that the Lauder mentioned above was hospital sergeant in Calgary.

DR. JOHN DROUGHT LAUDER

Dr. John Drought Lauder was born in Ireland in 1857, attended Trinity College, Dublin, and then studied medicine for three years in Liverpool. In 1875 he sailed for Nova Scotia, where he remained for one year and trained as a veterinary surgeon. Then he joined the mounted police. In 1877 he became hospital sergeant. After two months as such he was transferred to Calgary, where he remained for two and half years in a medical capacity for the government. In 1880 Dr. Lauder served in different points in the northwest, and in 1881 became sub-agent of the Blackfoot Reserve. One year later he was foreman of the famous Cochrane Ranch, which was then under the management of Col. Walker. In 1885 Lauder joined Major Hatton's troop of Alberta Rifles as lieutenant. The rebellion quelled, Lauder ranched four miles north of Calgary for a number of years. He served two years on the Northwest Council at Regina, being elected in 1886. On the death of Dr. George Verey,* the first practitioner of Edmonton, Dr. Lauder was invited to locate in that village. His request for a bonus of $2,400 a year was unacceptable to the citizens and he continued ranching. From 1892 he resided at Innisfail, Alberta, until his death, two years ago.

DR. HERCHMER

The Herchmer referred to in Nevitt's diary was the fourth son of the Rev. William M. Herchmer, of Kingston, Ont. He was born on December 9, 1849, educated at Brighton, England, and after studying medicine at Queen's University, Kingston, went to Louisville, Ky., where he graduated. In 1870 he accompanied the Wolsley Expedition to the Red River. He enlisted in the mounted police as a constable in 1874. He was stationed for a time at Fort Saskatchewan. Leaving the force he engaged in farming not far from there. Late in 1881 he was medical superintendent of the Northern Pacific Hospital at Brainard, Minn. Returning to Canada, he was in charge of the medical work on the C.P.R. construction in the mountains, with headquarters at Donald. He died at Egypt.

* Other reference to Verey, with portrait, can be found in the *Journal*, 1933, 29: 431.

Wash., on November 3, 1896. He was a brother of Commander Herchmer, late of the Royal North-West Mounted Police.

Nevitt returned to Toronto in 1878 to enter civil practice. When the Woman's Medical College was established in 1883 the Chair of Sanitary Science was occupied by R. B. Nevitt, M.D. Dr. A. McPhedran became Dean in 1887, but resigned the next year. Nevitt became his successor and discharged his duties as Dean and Professor of Clinical Surgery until the closure of the College in 1906. Following this, he continued his duties at the Woman's Hospital and Dispensary, and retained his surgeoncy at St. Michael's Hospital. He was a charter member of the Toronto Academy of Medicine. Shortly before his death on May 11, 1928, this Society made him an Honorary Member *in perpetuo*. His passing removed one of the links joining eastern and western Canadian medicine, and its recent date shows how close to the present was the past in southern Alberta.*

MEDICAL MEN AT FORT MACLEOD, LETHBRIDGE AND PINCHER CREEK

Since Fort Macleod was the centre of population in the south in the seventies one must make note of several police surgeons before mentioning practitioners of Pincher Creek and Lethbridge, the next two centres requiring medical aid.

Dr. George Allan Kennedy (Fig. 4) received his appointment as an assistant surgeon on October 1, 1878, and was sent to Fort Macleod. In 1880 he was at Fort Walsh, where he remained until October, 1882, when he returned to Fort Macleod. He resigned his commission in July, 1887, but returned in a temporary capacity for a short time in 1888. He was born on April 16, 1858, in Dundas, Ont., and obtained his degree in 1878 from McGill. He was an ardent and expert polo player and did much to advance this game in the West. In 1889 at the Banff meeting of the Canadian Medical Association he presented a paper on "The climate of Alberta", which was the first medical paper to be delivered by a practitioner of this province.

Dr. H. Y. Baldwin served in Macleod from 1887 to 1888. He belonged to a well known family in Ontario. He died a few years ago in Edmonton. Peter Aylen, 1891 to 1894 at Macleod, was a McGill graduate (1886). He was in Calgary from 1889 to 1891. He died a few years ago at Fort Saskatchewan. F. E. Powell served there from 1887 to 1889. J. C. McNamara served at Macleod in 1889, and was in Calgary in 1890, but for how long it has not been possible to ascertain.

E. A. Braithwaite (Fig. 8), the present Chief Coroner of Alberta, was with the police in Macleod in 1886. He joined the force on May 7, 1884. Immediately on completing his drill and riding school the authorities found out that he was a medical student, and he was made hospital sergeant at Regina. In 1885 he was sent as medical attendant to Prince Albert. No sooner there, than he left with the police, 300 strong, to go to Fort Carleton. There he arrived just after the Duck Lake fight and was busy with the wounded. After the Battle of Batoche Riel was captured. Dr. Braithwaite was present at his execution. In 1885 he was hospital sergeant at Lethbridge. He writes:

> "In the Spring of 1886 a young doctor arrived under contract with the Galt mines, and he became acting assistant surgeon, and I retired to the lesser dignity of hospital sergeant. In September there was built a combined police and miner's hospital. I was the first to sleep in it and this was the beginning of the present Galt Hospital in Lethbridge." (Fig. 6).

The young doctor mentioned above was the late F. H. Mewburn one of a long line of medical military men. One Francis Mewburn, in 1765, in the city of Durham, England, signed articles with a medical practitioner for a term of seven years to learn "the Art, Science and Mystery of an Apothecary". For the sum of fifty pounds he was to receive, "good, wholesome and sufficient meat, drink and lodging fit and convenient for him". He practised in Whitby, England, for many years. When Napoleon threatened to invade England he obtained a commission as a Captain of Volunteers.



Fig. 6.—The small building was the first hospital in Lethbridge (Galt Hospital).

* For other details relative to Dr. Nevitt, with portrait, see this *Journal*, 1928, **19**: 382.

John Mewburn, son of the above, practised in England until 1832, when he emigrated to Canada. His son F. C. Mewburn also studied medicine, and in 1838 passed the medical board of Upper Canada. After serving as a military surgeon with a coloured corps he settled in Weston in 1845. From here he moved to Niagara Falls, where he resided for thirty-five years. While there he received an honorary degree from the University of Buffalo. Frank Hamilton was at that time professor of surgery in that institution and a friend of Dr. Mewburn's. The latter moved to Montreal and later lived in Toronto.



Fig. 7.—Montreal General Hospital interns, 1882. *Sitting,* John A. Macdonald and James Bell; *standing,* A. Henderson and F. H. Mewburn.

Dr. Frank Hamilton Mewburn (Fig. 9) was born at Drummondville, which was near Niagara Falls, in 1858. After graduation from McGill University in 1881 he served as an intern in the Montreal General Hospital (Fig. 7). There were three others—Alex Henderson who was the first civil practitioner in Calgary, James Bell, later Professor of Surgery in McGill, and John A. MacDonald. The Canadian Pacific Railway was opening up the west now and Mewburn had a roving spirit. He went to Winnipeg and was appointed house surgeon in the Winnipeg General Hospital. In 1885 the rebellion broke out and he was in charge of the Military Hospital in the Manitoba capital. From 1886 until 1913 he was medical officer to the Galt Coal Company in Lethbridge. Moving to Calgary in the latter year, he specialized in surgery. When the Great War started, true to family tradition, he went overseas as a Major in the C.A.M.C. Becoming a Lieut.-Colonel in 1916, he was placed in charge of the Surgical Division at Taplow. In 1918 he was invested by His Majesty with the Order of the British Empire. When the University of Alberta added the final years to its course of instruction Dr. Mewburn became the first Professor of Surgery in the medical faculty. He died on January 29, 1929. His son, H. H. Mewburn, is an orthopædic surgeon in the same University, and a grandson is a medical student. Probably no family, at least from Quebec west, has a medical record of nearly two hundred years. The O'Reilly's and Orton's, of Ontario, perhaps come next in length of time.

Another pioneer of Lethbridge deserves mention. Dr. Leverett George de Veber joined the

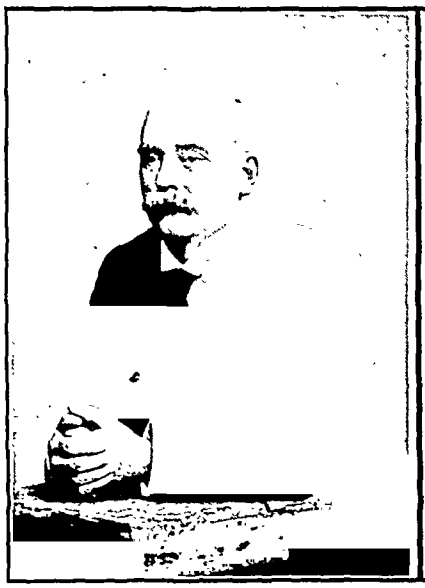


Fig. 8.—Dr. E. A. Braithwaite.



Fig. 9.—Colonel F. H. Mewburn.



Fig. 10.—Dr. H. Rimmington Meade.

police as surgeon in 1882, and served at Fort Walsh, Fort Macleod, and Calgary. He resigned in 1885 to practise in Macleod. In 1893 he became Medical Officer Health in Lethbridge. Five years later he was elected to the North-West Assembly at Regina. In 1905 he was elected to the Alberta Legislature, but receiving an appointment to the Senate he did not take his seat in the local House. He died July 9, 1925. Following these two first practitioners of Lethbridge came Drs. W. S. Galbraith in 1899, P. W. Tuller in 1904, C. C. Cragg in 1905, P. M. Campbell in 1906, A. A. McNally in 1907, and D. A. Taylor and J. E. Lovering in 1908.

Pincher Creek also deserves attention. In 1882 ranching having commenced in that district, Dr. H. Rimmington Meade (Fig. 10), was encouraged to start practice. He received his medical education in England. Evidently his professional duties were not arduous, for Dr. Meade was one of the organizers of a Hunt Club. This club formed in 1883 was not the success it was expected. Fox hounds were imported but were no match for the coyotes. These hounds run by scent and the coyotes were too fast for them. Meade also became an expert polo player and a member of the second oldest club in America. He died at Pincher Creek in 1898. Dr. Montgomery Smith, another English graduate, joined Dr. Meade, but after several years in partnership returned to his native land. These men were succeeded by Dr. S. W. Hewetson who was killed in action, R. de Lotbinière Harwood, now of Vancouver, and George H. Malcolmson, of Edmonton.

There was nothing spectacular, nothing heroic in the lives of these men in the early days of medical practice in southern Alberta. All the pioneer doctors, with the exception of Meade, Smith and Mewburn, started with the police, and later as the civilian population increased doffed their red coats to try their fortune among the ranchers and inhabitants of Macleod, Pincher Creek and Lethbridge, the centres south of the main line of the C.P.R. Supplies were hard to obtain, having to come in by way of Montana, but, with an ingenuity born of necessity and what skill was given them, they rode the long and uncertain trails of the foothills and prairie, giving service and courage to their patients.

"Also, loke that thou drynke not pure watir when thou hast eten thi mete, but if thou have usid it; for the cold watir put upon thi mete coldith thi stomak and quenchith the hete of thi digestioun, and confoundith and grevith thi body. And if thou muste drynke watir for the grete hete of thi body or of thi stomak, take it attemperately, and not ovirmoche attones ne to ofte."
—*Secreta Secretorum.*

Association Notes

The Sixty-ninth Annual Meeting of the Canadian Medical Association, Halifax, N.S., June 20-24, 1938, Conjointly with the Nova Scotia Medical Society

The arrangements for the coming meeting of the Canadian Medical Association are proceeding apace, and there is every indication that the gathering will be an unqualified success. The letters from His Honour the Lieutenant-Governor of Nova Scotia and His Worship the Mayor of Halifax, speak for themselves. Their messages of welcome are much appreciated.

To
The President and Members of
The Canadian Medical Association,
Gentlemen:

On behalf of the people of Nova Scotia it gives me great pleasure to extend to the Canadian Medical Association a most cordial invitation to our City and Province and to assure you we will endeavour to make your visit a most pleasant one.

Yours sincerely,

(Signed) ROBERT IRWIN,
Lieutenant-Governor.

The President and Members,
Canadian Medical Association.

As Mayor of the City of Halifax I extend to you and your members the freedom of the City for the duration of your Convention or longer, if you could use it.

Our City is an old one with many points of historical interest; its health services are well advanced for a city of its size; its opportunities for enjoyment such as golfing, boating, deep sea fishing, game fishing, etc., are unexcelled in Canada; and these, together with the friendliness of the citizens of Halifax, I feel sure will cause your stay here to be a very pleasant one.

Wishing every success to your Convention, I remain,

Yours very truly,

(Signed) WALTER MITCHELL,
Mayor.

Clarke Steamship Company, Limited, Dominion Square Building, Montreal: Sailings from Montreal and Pictou in June.

The S.S. *New Northland's* itinerary is as follows:

Leave Montreal Tuesday, June 14, 8.30 p.m.
Arrive Quebec Wednesday, June 15, 8.30 a.m.
Leave Quebec Wednesday, June 15, 2.00 p.m.
Arrive Ste. Anne des Monts Thursday, June 16, 2.00 p.m.
Leave Ste. Anne des Monts Thursday, June 16, 3.00 p.m.
Arrive Gaspé Friday, June 17, 7.30 a.m.
Leave Gaspé Saturday, June 17, 4.00 p.m.
Arrive Summerside Saturday, June 18, 10.00 a.m.
Leave Summerside Saturday, June 18, 4.00 p.m.
Arrive Charlottetown Saturday, June 18, 9.00 p.m.
Leave Charlottetown Sunday, June 19, 4.00 p.m.
Arrive Pictou Sunday, June 19, 9.00 p.m.
Leave Pictou Monday, June 20, 5.00 p.m.
Arrive Comeau Bay Wednesday, June 22, 11.00 a.m.
Leave Comeau Bay Wednesday, June 22, 6.00 p.m.

Arrive Saguenay River Thursday, June 23, 5.00 a.m.
Leave Saguenay River Thursday, June 23, 11.00 a.m.
Arrive Murray Bay Thursday, June 23, 3.00 p.m.
Leave Murray Bay Thursday, June 23, Midnight.
Arrive Quebec Friday, June 24, 7.00 a.m.
Leave Quebec Friday, June 24, 2.00 p.m.
Arrive Montreal Saturday, June 25, 8.00 a.m.

The Cruise Rate on this sailing runs from a minimum of $75.00, but the one-day rates have not yet been definitely decided upon.

The rate for an automobile, when accompanied by passenger, from Pictou to Montreal is $20.00, $25.00 or $30.00, depending on the wheel-base.

The Committee on Housing and Hotels advises all those wishing hotel reservation to write *AT ONCE*, direct to the hotel of their choice. If that hotel is filled to capacity the Committee will do its best to provide the next best accommodation.

Following is a list of the hotels with their capacities and rates:

Nova Scotian Hotel, 100 double rooms, $5.00 - $6.00
Lord Nelson Hotel, 100 double rooms, single $3.00; double $5.00 up; suites $8.00 up.
Carleton Hotel, 25 rooms, single $1.50 up; double $3.00 up.
Halifax Hotel, 75 rooms, single $2.00 up; double $3.50 up.
Queen Hotel, 75 rooms, single $1.50 up; double $2.50 up.

Those wishing to reserve accommodation in smaller establishments or in some of the nearby seaside hotels should communicate with the Chairman of the Committee who will gladly forward lists of such places— *Chairman*, Dr. A. R. Morton, 2 Brenton Place, Halifax, N.S.

Our readers are advised that the May issue of the *Journal* will be the SPECIAL CONVENTION NUMBER, and will contain the advance program and much interesting matter in relation to the city of Halifax and its institutions, together with other details.

Medical Societies

Regina General Hospital

Dr. J. C. Paterson gave the pathological report for the past eleven months at the staff meeting of the Regina General Hospital on February 11th as follows.

"*Appendicitis.*—From March 1st to October 1st there were 316 appendicectomies; of these 84 were routine cases, leaving 232 operated on for appendicitis. Clinically, 78 per cent were considered to be acutely or subacutely inflamed; pathologically, 54 per cent showed inflammation, a clinical diagnostic error of about 25 per cent. For the ensuing four months, that is, October 1st to January 31st, there were 173 appendicectomies for appendicitis; of these 65 per cent were thought, clinically, to be acutely or subacutely inflamed; pathologically, 50 per cent were inflamed, a clinical diagnostic error of only 15 per cent. For the two series of cases then, the latter showed an improvement in clinical diagnosis of almost 50 per cent.

"During the last four months there were 26 cases wrongly diagnosed; only 10 of these had had white blood-cell counts done, and in 7 of the 10 the count was below 10,000; in spite of this, the clinical diagnosis was acute or subacute appendicitis. Three cases were diagnosed as acute appendicitis where the white-cell count was 12,000; 14,000; and 15,000. The appendix was essentially normal in each case, with one exception in which a pin worm was present and probably caused obstruction. In the other two cases no cause for pain or increased white cell counts was found in the appendix.

"Several appendices routinely removed during gall-bladder surgery have shown subacute or acute inflammation; in one of these cases the gall-bladder was normal. Thus we note that appendiceal pain may simulate gall-bladder inflammation, and gall-bladder and appendix inflammation go hand in hand. The tests for suspected appendiceal inflammation in the operating room are infiltration and the loss of the normal fæcal content of the appendix. It is remarkable how many acute and subacutely inflamed appendices have been removed in this hospital in eleven months; about 200. I believe that appendicectomy is usually justified if there are any suggestive symptoms; the removal of a normal appendix is no disgrace. However, there is a tendency to call too many of these appendices inflamed when there is no definite clinical evidence except pain to back up the diagnosis. These cases would be better diagnosed as appendicitis with a large question mark.

"*Gynæcology.*—Curettage. There were 172 in 6 months; there were 13 cases of therapeutic and 2 of inadvertent abortion; there were 65 cases of retained secundines; 9 of these were in unmarried girls; there were 5 cases of cancer of the uterus. There were 86 cases of endometrial hyperplasia; 15 of these were of the typical Swiss cheese variety of the type resulting in uterine bleeding. The remainder were essentially normal, but that is no reason why a curettage should not have been done. Probably many were done as routine procedures preceding hysterectomy for fibroid, for sterility or dysmenorrhœa, in which cases the scrapings would show no lesions.

"*Ovaries.*—There were 72 ovariectomies in the 6 months' period; 50 of these were of the entire ovary. Fourteen ovaries were removed for small follicular cysts; in these 14 cases the ovary was needlessly sacrificed, simple excision of the cysts would probably have sufficed unless there was definite clinical evidence unknown to the pathologist, why complete ovariectomy was indicated.

"*Thyroid.*—From March 1st to October 1st there were 46 thyroidectomies; 22 of these were

diffuse hyperplasia; 16 cases were hyperplastic adenoma, all toxic; 2 cases were Riedel's struma, and 2 cases Hashimoto's disease; 4 cases were colloid goitre.

"*Gall-bladder.*—From March 1st to October 1st there were 49 cholecystectomies and 6 cholecystostomies; 30 of these cases had gall stones. Of the 49 cases 48 showed pathological conditions. One gall-bladder was normal, but the appendix in this case showed a subacute inflammation which was very probably responsible for the patient's symptoms. For the remaining 4 months, October 1st to January 31st, there were 19 cholecystectomies; one gall-bladder was normal, all the rest were diseased. This normal case gave a history of indigestion and colic for 11 years, and the x-ray diagnosis, not done in this hospital, was chronic cholecystitis. Gall-bladder dye tests were done on 7 patients in this hospital who afterwards were operated on; it is a pleasure to report that when cholecystitis was reported by our radiologist it was found pathologically, and where stones were visualized they were present at operation. Our radiologist was therefore 100 per cent accurate over this series.

"*Breast surgery.*—March 1st to January 31st. There were 49 specimens; 14 cases of carcinoma, radical operation; 14 cases of adenofibroma, quadrant removal; 3 cases of chronic mastitis (mazoplasia) simple mastectomy; 15 cases of chronic cystic mastitis, 7 quadrant removal, 8 simple mastectomy; 1 case of chronic suppurative mastitis, radical removal; 1 case of fat necrosis following frost-bite, simple mastectomy; 1 case of hypertrophy, simple mastectomy. It is important to verify the clinical diagnosis of malignancy by quick section or by a two-stage operation before performing radical and mutilating operations.

"*Autopsy report.*—There were 159 autopsies during 1937 which was 48.3 per cent of the deaths; in 1936 autopsies were done on 14 per cent of the deaths. I congratulate the staff on their efforts in this respect. It is probable that few hospitals in Canada admitting private patients as well as public ones can duplicate this figure.

"Malignant disease was the cause of death in 20 per cent of the autopsies. Heart disease in 13 per cent was made up of a variety of lesions. Bronchiectasis with its resultant increased intrapulmonary pressure caused failure of the right heart in 4 cases. Coronary disease, with or without thrombosis, accounted for only 5 per cent of the deaths. There is reason to believe from newspaper reports that coronary thrombosis is far commoner here than our figure suggests; almost every week one reads of a sudden death on the street or in the house which on coroner's autopsy is diagnosed as a heart attack; it is a pity that these autopsies are not performed by people who are interested in heart lesions.

"There were 2 cases of phimosis in infants, with resulting hydronephrosis and uræmia; neither was diagnosed clinically. There were 2 cases of streptococcal and staphylococcal bacterial endocarditis which did not improve with prontosil. There were two cases of congenital cystic kidneys, one in a man 50 years old, both died of terminal uræmia. There were 3 cases of anterior poliomyelitis; 3 cases of meningococcic meningitis, 2 of which were treated with serum.

"We have had 8 autopsies on patients from the eye, ear, nose and throat department. Two of these were cancer (*a*) cancer of the larynx, which in spite of radiation therapy went on to complete obstruction and eventual bronchopneumonia; (*b*) cancer of maxillary antrum which invaded the brain and resulted in meningitis.

"There were 2 cases of sphenoidal sinusitis. Both of these fatalities followed surgical intervention; in one case meningitis followed submucous resection, while in the other a nasal polyp had been removed ten days before. In each case the operative procedures had apparently lighted up a chronic infection of the sphenoidal sinus, which had spread to the meninges.

"There was 1 case of maxillary sinusitis. This infection was acute and followed drainage: the patient ran a high temperature and died of septicæmia.

"There were 2 cases of chronic otitis media. One case developed brain abscess following mastoidectomy. The other case differed in that meningitis developed from a chronic mastoid infection which had not been treated surgically. This case developed streptococcal meningitis and died in spite of prontosil therapy.

"The most interesting case in this series is one of chronic tonsillitis which, after tonsillectomy, developed septic thrombosis of the jugular vein and eventually cavernous sinus thrombosis. This case shows that even the most minor surgical procedures carries a definite operative mortality." LILLIAN A. CHASE

TREATMENT OF THREADWORMS.—A. Castellanos, A. V. Paussa and J. P. Trujillo, who record 24 illustrative cases, maintain that the citrate of iron and ammonia in large doses—amounting to 6 to 8 grams in all—two or three times a day is well borne by children, and in such amounts has a destructive action on threadworms. Some cases, however, prove refractory, and it is impossible to say if they can be sterilized by larger doses, such as 5 to 12 grams, for example. The drug is also very effective when given in enemata which enable it to reach the cæcum.—*Bol. Soc. cubana Pediat.*, October, 1937, p. 425. Abs. in *Brit. M. J.*

Special Correspondence

(The following note on medical conditions in Northern Nigeria has been sent us by one of our younger graduates, Dr. Guy H. Fisk. Dr. Fisk has contributed to our columns and we welcome his interesting sidelights on conditions in one of the less conspicuous portions of the British Dominions.—ED.)

Medical Practice in Northern Nigeria

If variety is what you like, then Northern Nigeria is the place for it. Medicine as practised in the Plateau Province of Nigeria provides unending variety and sufficient work for the most ambitious. Indeed in some stations, in addition to being the doctor, the medical officer may be the only white man in the district when the administrative officer goes on tour. He will then have to receive the police reports and review the armed guard, in addition to his medical duties.

I was sent to take charge of an African hospital in a town called Jos. It had 130 beds, divided among six wards. In addition to this there were small, round mud huts which had to be used for the overflow. When all these were filled we then had to put patients on the floor between the beds. This gave us a total capacity of about 180 patients. Enough, you might consider, to keep one doctor busy. Besides this there was a daily outdoor of 110 to 140 patients; also, a ward at the government prison with a capacity of 10 beds which required a daily visit. The staff which looked after this hospital consisted of 1 white nurse, 18 black male nurses, 3 black female nurses, 10 native ward servants and labourers, and 2 black dispensers.

The white nurse supervised the rest of the staff and looked after stores. This was essential, as everything in the hospital had a saleable value. Unless great care was taken and supplies issued in small amounts we should have shortly found ourselves without anything to work with. The native staff was helpful as far as it went. Unfortunately, it did not go very far when judged by our western standards. Night nurses had no shame about getting into bed and sleeping with the patients if they were not checked up. However, they all meant well, and when one learned not to expect too much from them they did very well. Anything really important had to be done by one's self. Another interesting thing about the staff was their fatalism. If they thought a patient was going to die, no matter whether he was a close relative or not, they could not see the sense of working over him in an attempt to save him. This led them occasionally to neglect a seriously ill patient for one not so sick.

In spite of being in the tropics, tropical diseases did not predominate. Surgery was the largest part of the work. In six months I performed 584 operations, roughly three a day. These were divided into 322 minor operations, and 262 majors. Amongst the minors were dental extractions, entropions, dilatation and curettages, submucous resections, Colles' fractures, and similar things. The majors included amputations, hernias, strangulated and simple, resections of intestine, thyroidectomies, cataracts, hydroceles, empyemata, compound fractures of the skull, splenectomy, phrenic evulsions and suprapubic cystostomies. In spite of the varied list the mortality was only eight. Three died from tetanus contracted before they reached hospital after small accidents; 2 died from carcinoma too far advanced to be benefited by surgery, and 3 died from generalized peritonitis present when the abdomen was opened. One of the peritonitis cases was a perforated typhoid ulcer; one, a strangulated hernia of six days' duration with complete necrosis of the jejunum; and the last, a ruptured gall bladder with generalized peritonitis of five days' duration. As the African native only comes to hospital after he has tried all the native medicines it is not too bad a record.

The most common medical condition was pneumonia, and the African has the same poor resistance to it that the European shows. Then, in the district of Jos sleeping sickness, or trypanosomiasis, was common. Syphilis and gonorrhœa were both plentiful. Amongst the rare diseases were, disseminated sclerosis, sickle-cell anæmia, and "mossy foot". Every medical condition is seen sooner or later, however, even to hysteria. This latter may sometimes be simply cured, but often resists the most well meant efforts.

The hospital had a small laboratory and autopsy room with a trained attendant who did all the routine urines and stools. Anything unusual or complex I had to do myself. Differential blood counts were beyond him, although he was able to spot trypanosomes and some of the malarial parasites. He could do Kahn tests when supervised. As the autopsies were all in medico-legal cases they required considerable care and evidence had to be produced in court which might even result in a man being hanged. Many people died out in the "bush", and when the death was reported, if the administrative official thought it looked like murder an autopsy would be ordered.

The African native is still very primitive, even when he has a western veneer over his bush background. When you are taking a history he will always endeavour to give you the answer that he thinks pleases you, so that histories are very unreliable. Then again none of them know how old they are. They will sometimes guess, but generally the nearest you can get is that they had just reached puberty when the white men came to the country. Or else that they had just got married when they had their first ride in a railway train. Another one of his traits is

that he has a firm belief in witchcraft and magic. A patient with an ulcer on his leg will quite seriously state that it was caused by evil spirits and stick to his story. Any cerebral manifestations, such as paralysis, etc., in their eyes are always due to supernatural causes, and nothing will shake this belief.

If a patient feels better he at once decides that he is cured, and must go home even if home means a walk of fifty miles or more. Pneumonia patients will get up the day after their crisis, and three days later abscond from the hospital. Strange as it may seem, they survive. Thyroidectomy patients leave the hospital once the sutures are removed and sometimes even before. None have dropped dead yet, although I always expected to see them collapse before they reached the door. Only those who are physically unable to walk can be kept in bed; the rest get up and walk around during the day. When they see the doctor coming for ward rounds there is a mad scramble for the beds, and as you enter the ward you see patients running in from all directions.

Patients have either to walk to hospital or to get some friend to carry them. I have seen men and women carried "pick-a-back" with broken legs, pneumonia, and other serious diseases. They will probably have travelled for two or three days like this, and even then they survive.

Native medicines are legion, and vary from the educated Moslem type to the primitive pagan variety. The Moslem type is to write a charm on a slate or paper and wash it off with water and then drink the water. This, at least, is harmless. The pagans love to put a handful of cow manure or dirty palm oil on a wound and then a leaf on top of that. This usually converts a small scratch into an ulcer about five inches in diameter in a few days.

This rough sketch gives an idea of the work that a medical officer is called on to do in Nigeria. As a place to study diseases that have long since disappeared from the civilized world it is unrivalled. Small-pox in all its most malignant forms can be seen daily; leprosy, syphilis and tuberculosis are present in every stage and form imaginable. All the diseases which we know to be due to dirt and filth are rampant. The government staff and hospitals do their best, but what can one hundred odd doctors do in the midst of twenty million untutored savages but merely scratch the surface? The hospital at Jos alone serves over a million people. Gradually, by education, it is hoped to eliminate some of the worst epidemics, but even this will take half a century. For the doctor who works here it is better than a textbook, for within a month you will have seen all the diseases mentioned in Osler, from typhoid to ainhum; and what more could a medical man desire?

GUY H. FISK, B.A., M.D., C.M.,
Jos, Northern Nigeria. D.T.M.&H.

Letters, Notes and Queries

Histological Indications of the Sites of Air Leakage from the Lung Alveoli into the Vascular Sheaths during Local Over-inflation of the Living Cat's Lung

To the Editor:

Since the publication in this *Journal* of my address on Experimental Pneumothorax, which was given at Milan, Italy, before the International Anatomical Convention, I have gone further with this research and have found what I think is a reliable indication of the situation of the ruptures occasioned by the prolonged overinflation of a local region of the living cat's lung through a catheter introduced *via* the trachea. After a suspension of fine carmine particles in hot gelatin is injected into the formerly overinflated part, immediately following the collapse of the lung, through the same catheter, which was allowed to remain in place, and after the swollen part is cooled, fixed and sectioned, there are found accumulations of carmine grains on the alveolar bases overlying the vascular sheaths. The latter now contain gelatin, in addition to the bubbles of air remaining from the interstitial emphysema resulting from the overinflation. This finding suggests that the hot gelatin passed through artificial openings in the alveolar bases, representing the ruptures through which the air had previously escaped, which were in this case so small that they held back the carmine grains. This impression is strengthened by the observation that the gelatin within the vascular sheaths often contained few or no carmine grains. Again, in some places, the gelatin in the sheaths was marked by streams of carmine grains which had obviously come from the bordering alveoli through holes of a size so large that they failed to filter out the carmine particles. This finding gives support to my original supposition that air was leaking out from the alveoli, not through holes in the visceral pleura, but through the alveolar bases which border upon the vascular sheaths, and that thus was produced an interstitial emphysema. If air continues to break through from the alveoli it dissects a "false passage" in the vascular sheaths and pours into the mediastinum which it dilates; and if the quantity of air is sufficiently great there ensues a rupture of the mediastinal wall with escape of air into the pleural cavity, and the production of pneumothorax with massive collapse of the lung. Details of this mediastinal emphysema and rupture are to be found in my original paper. (Pneumothorax with massive collapse from experimental local overinflation of

Answers to letters appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

the lung substance, *Canad. M. Ass. J.*, 1937, 36: 414).

I reported this gelatin work at Königsberg, East Prussia, on August 25th last, to the Anatomische Gesellschaft, and it has appeared in the "Verhandlungen" of that Society, page 78 (see Ergänzungsheft zum anatomischen Anzeiger, Bd. 85, 1938).

C. C. MACKLIN.

London, Ont.

Panel Practice in Great Britain

To the Editor:

In the January issue of the *Canadian Medical Association Journal* I saw your request for information and impressions of the panel system in Great Britain. As I have been practising here for over a year in a practice with a moderately large panel I thought my impressions might be of interest.

First let me state that my reaction to the panel system as a whole is favourable though this is certainly far short of perfection. I think it is a valuable step towards the goal of preventive medicine and should be welcomed as such, though we should at the same time recognize its faults.

Panel patients are expected to come to the doctor's office, if possible, and are not to call the doctor between 8 p.m. and 8 a.m. except for emergencies. I have very rarely found these regulations broken—the exceptions being very nervous patients who become panicky and call one out during the night. The great majority of those who come to the office during the regular hours are quite justified in seeking advice, though there is the occasional neurotic who becomes an absolute pest. The problem of patients repeatedly coming without justification I have found to be very trivial. Against this disadvantage one can place all those patients whose disease was diagnosed earlier because of their seeking attention in time (*e.g.*, early tuberculosis), and also those who require prolonged treatment (*e.g.*, myxœdema, peptic ulcer, auricular fibrillation, pernicious anæmia) and who probably could not be persuaded to continue it if it cost them anything. In my experience this last group was many times more numerous than those who sought advice without justification.

The Approved Societies are a very valuable part of the system, giving the insured person a certain proportion of their income while they are unfit for work. Due to this, people are able to stop work when they really should; in such things as acute bronchitis and chronic appendicitis this makes it possible to persuade the patient to have proper treatment and thus avoids many complications. The presence of a divisional medical officer to whom the approved society or the doctor may appeal as a referee in cases of suspected malingering is also a very valuable proviso. The patient's own doctor gives his report of the case and can be present at the examination by the divisional medical officer if either party desires it.

The scope of the treatment is that which would be expected of the average general practitioner. At present there is not sufficient provision made for specialist attention. I have seen many patients whose teeth were in a very bad condition but who could not afford to have them properly treated. Similarly, patients in need of glasses who could not get them. In many cases both these types of treatment can be obtained through the National Health System, but it should be made universal if the efficiency is to be satisfactory. Surgery and other specialist treatments on panel patients are done in the public wards or out-patients' departments of hospitals, the consultant receiving no fee for it—hardly a fair arrangement.

From my experience of a panel with about 1,300 patients I would say that that number is sufficient to keep one man busy, even if he had no private work. In contrast with this is the maximum of 2,500 allowed to one man under the National Health Act. I would say that one thousand would be a suitable maximum; even then satisfactory treatment could only be given if the private work was light. Of course the figure of 2,500 is closely related to the ridiculously low capitation fee under the British panel scheme. Any change in the maximum numbers allowed to one practitioner would have to be accompanied by a rise in the capitation fee.

In conclusion, I consider the panel scheme is justified, since, by giving earlier treatment in serious diseases and medical supervision in minor ailments, it is a step forward in the field of preventive medicine. The neurotic is a minor element and the malingerer can be dealt with by reference to the regional medical officer. The approved societies, by their form of insurance, make the burden lighter on a poor man while incapable of work, and make more effective treatment feasible. The most urgent changes needed are a rise in the capitation fee, associated with a reduction in the maximum number of panel patients allowed to any one practitioner. After this I would suggest that arrangements for specialist treatment for everybody should be made.

P. M. YOUNG, M.D.

North Place,
Hatfield, Herts, Eng.,
February 20, 1938.

P.S. I have confined myself strictly to my own experiences and opinions in this letter, and have not included descriptions of other practices of which I have heard but of which I have no personal experience.

Medico-Legal

The Liability of Hospitals

(Prepared by the Executive Committee of the Canadian Medical Protective Association, Ottawa)

A few weeks ago the Court of Appeal for the Province of Ontario gave judgment in the case of Vuchar and The Trustees of the Toronto General Hospital to determine the liability of a hospital for the negligence of its servants.

The judgments of the Chief Justice of Ontario and of Mr. Justice Masten contained in the 1937 Ontario Reports at page 71 contain a very clear and full discussion of the various authorities dealing with this branch of the law, and for the information of the profession at large it may be of interest to summarize what has been determined to be the liability which the hospital assumes for the negligence of its servants and at what point the burden of responsibility will rest upon the doctors and their professional assistants alone.

1. The responsibility of the hospital authorities is limited to undertaking that the patient shall be treated only by experts, whether surgeons, physicians or nurses, of whose professional competence the authorities have taken reasonable care to assure themselves, and, further, that these experts shall have at their disposal for the care and treatment of the patient fit and proper apparatus and appliances.

2. The hospital is not responsible to patients for mistakes in medical treatment or in nursing on the part of its professional staff of doctors or nurses, of whose professional skill it has so assured itself, nor for the negligent use by them of the apparatus or appliances which are at their disposal.

3. The hospital is responsible to the patient for the due performance by the members of its professional staff within the hospital of their purely ministerial or administrative duties. This means the hospital is legally responsible to the patient for the due performance by its servants within the hospital of such duties as the attendance of a nurse in the wards, summoning of medical aid in case of emergency, the supply of proper food and the like. The management of the hospital makes its own regulations in respect to such matters of routine, and it is legally responsible to the patient for their sufficiency, their propriety and the observance of them by its servants.

So far as interns are concerned, there are certain cases in which they may act as physicians and surgeons, and, in such cases, their relation to the hospital is the same as that of a visiting physician or surgeon, and the hospital is not responsible to patients for their mistakes in medical or surgical treatment. But, for the most part, they act in another capacity. The hospital has a regular staff of physicians and surgeons and these, unlike the interns, are not constantly in attendance at the hospital; they must frequently be sent for, and the hospital undertakes to send for them through its agents. The interns are the agents to perform this duty, and it is a rule in every well-ordered hospital that in all cases requiring immediate and important action, in all doubtful cases, and in all cases requiring an immediate operation, the intern shall send for the physician or surgeon in charge of the case, and, if he cannot be found, the intern must use all reasonable means to secure another in his place. If the intern neglects to call the physician or surgeon in the class of case designated, his neglect is the neglect of the hospital and liability will result.

It is clear from the leading decisions that the moment the door of the theatre or operating room has closed for the purposes of an operation the servants of the hospital in attendance cease to be under the orders of the hospital and are at the sole disposal and under the sole orders of the operating surgeon until the whole operation has been completely finished. The surgeon is, for the time being, supreme, and the hospital cannot interfere or gainsay his orders. The nurses and carriers, therefore, assisting at an operation, cease for the time being to be the servants of the hospital, inasmuch as they take their orders from the operating surgeon alone and not from the hospital authorities. What is equally so, but not so generally known, is the case where the patient does not enter the operating room, but instead goes to the clinical room for observation and then to one of the wards. Those assisting the attending physician or surgeon in carrying out his instructions are just as much under his direction as though they were in the operating theatre itself, and the hospital authorities are free from liability for any negligence which may arise out of the way these professional instructions are discharged.

In brief, this is the state of the law disclosed by the judgment in the Vuchar case and by the British, American and Canadian authorities upon which it is based.

APHORISMS FROM FULLER

Measure not men by Sundays without regarding what they do all the week after.

Never speak but when you have something to say. Whereupon shouldst thou run, seeing thou hast no tidings?

Associate with men of good judgment: for judgment is found in conversation, and we make another man's judgment ours by frequenting his company.

Choose such pleasures as recreate much, and cost little.

He that sips of many arts drinks of none.

Abstracts from Current Literature

Medicine

Angio-Cardiografia en el Nino. (Angiocardiography in the Child). Castellanos, A., Pereiras, R. and Garcia, A.: Presented at the Congress of the Pan-American Medical Association, *La Propagandista,* Monte 87, Havana, Cuba, 1938.

An important practical aid in the differential diagnosis of cardiac defects and of changes in the right heart chambers may be obtained through the method described here as angiocardiography, in which the outlines of the superior cava, right chambers, cardiac septa, and pulmonary tract are defined by the injection of a radio-opaque substance immediately before roentgenography of the heart. In this communication, the authors have applied this procedure for the first time to congenital lesions in infants or children under six years with extremely interesting results. Their technique differs from that of the earlier workers in the arteriography of the pulmonary circulation, in that the radio-opaque substance is here injected into the elbow or long saphenous vein of the child, with the help of a small trocar, instead of being introduced directly into the right auricle. The material used was some 10 c.c. of a 35 per cent solution of Bayer's per-abrodil or Schering's uroselectan B in infants; in children from 4 to 6 years a larger quantity, 22 to 30 c.c. of uroselectan B was given, as this is denser and so gives better results. Carried out in this way, as described here in great detail by these authors, the procedure is said to be quite harmless. By a special contrivance of the x-ray tubes both antero-posterior and lateral pictures may be taken simultaneously.

The monograph ends with complete protocols of 9 cases with accompanying radiographs taken within 20 seconds after injection. In a tenth case, one of complete transposition of the arterial trunks, the injection was done post mortem and the diagnosis thereby established was confirmed at the subsequent autopsy.

MAUDE E. ABBOTT

Tuberculosis in Hospital Workers: A Summary of Canadian Data. Macklin, M. T.: *Tubercle,* 1938, **19**: 193.

The information contained in this paper was obtained from the answers to a questionnaire sent to all tuberculosis hospitals and sanatoria in Canada, three-fourths of whom answered. In all hospitals it is the rule either to tuberculin-test the nurses entering service and to x-ray the positive reactors, or to take skiagrams of the chests of all entrants into the nursing service as a routine. The negative reactors are tested usually at three-month intervals until they show a positive reaction, at which time they are x-rayed. Skiagrams are taken of all positive reactors at yearly intervals or oftener if there is any indication of a beginning chest lesion. Two-thirds of the hospitals prefer positive reactors and about one-fourth of them will accept only positive reactors. Some have to accept negative reactors because of the high incidence of negative reactors among their applicants especially in areas in which the nursing personnel is drawn from rural districts. About one-third felt there was no disadvantage to the nurse in being a negative reactor. Figures drawn from the nursing service of the mental hospitals of Ontario though small, suggest that the negative reacting nurse is apt to develop lesions in greater proportions than is the positive reactor. Most of the sanatoria accept graduate nurses only, or in such proportion that most of the staff are graduates. The nurses in the general hospitals with tuberculosis sections are mostly undergraduates. Most directors felt that raising the age at which nurses are accepted for tuberculosis work to 28 or 30 would lower the incidence of the disease among nurses. The incidence of tuberculosis in nurses in general hospitals is higher than in the sanatoria.

These data were presented before the British Medical Association at its annual meeting in Belfast, July 21, 1937. In the discussion which followed, it was remarked that Canada appeared to be ahead of England in the care taken in choosing girls for training, in the conditions under which nurses worked and were looked after if they broke down with tuberculosis. (*Brit. M. J.*, 1937, **2**: 239).

CHARLES C. MACKLIN

Gonococcic Endocarditis — 12 cases with 10 Post Mortem Examinations. Williams, R. H.: *Arch. Int. Med.,* 1938, **61**: 26.

This condition occurs more frequently than is usually thought, at an average age of 36 in the series studied. The interval between primary infection and development of acute gonococcal endocarditis showed great variation—3 weeks to 14 years. Arthritis, gonococcal in form, is usually present with the endocarditis, at first multiple, but finally settling in one joint as an acute inflammation. About half the cases showed embolic petechiæ, a small percentage arterial embolism in brain or leg. Embolic nephritis is frequently found. Recognition of these embolisms is a great aid in diagnosis.

The course is usually marked by frequent chills, "double peak" temperature fluctuations, and great fluctuations in temperature, as much as 8 to 10 degrees. Examination of the heart usually shows definite murmurs, mostly mitral or aortic, and daily observation will discover changes in the murmurs which indicate the progress of the disease in the valves themselves. Electrocardiograms agreed with the clinical picture except that in two cases where they were

negative, gonococci were found in culture in most of the cases and were recovered from the valve lesions or joints in a good many.

The difference between this condition and gonococcæmia is that in the latter the chills are less severe, temperature fluctuations less marked, and embolism is almost always absent so that the patients usually recover. In gonococcal endocarditis few, if any, recover; the cause of death is frequently acute (embolic) nephritis. These cases are not easy to diagnose, requiring careful study and observation. P. M. MACDONNELL

Surgery

Some Surgical Aspects of Tuberculous Disease of the Abdominal Lymphatic Glands. Colt, G. H. and Clark, G. N.: *Surg., Gyn. & Obst.*, 1937, 65: 771.

The authors report on some 239 cases. Primary infections are usually bovine, whilst secondary (two foci in the body) are usually human. In 172 cases affecting the mesenteric nodes chronic inflammation was found in the vermiform appendix in 52 per cent, with a distally atrophic appendix in an added 13 per cent. The authors believe that in all their cases the tubercle bacillus entered the lymph channels *via* the unbroken mucosa; all patients with ulcerated mucosa do not live a sufficient period to allow for calcification. Klotz' theory of calcium soap and Well's theory of physico-chemical formation are given equal credence in the deposition of calcium. Calcification probably occurs from 6 to 12 months after infection. Calcified lymph nodes may become free in the peritoneal cavity. Calcareous nodes may give rise to a recurrent type of intense, colicky pain, usually centrally placed; the caseous node, more often a dull ache. Both are relieved by heat and rest. Acute and subacute small bowel obstruction from the calcareous node and from adhesions, which were found in 25 per cent of this series, may necessitate resection or enterostomy as a preliminary operative measure. Axial rotation in an anti-clockwise direction along the ileocolic artery and volvulus have occurred. The authors used a paramedian incision and removed all the lymph nodes possible as a routine measure. A detailed technique is given. In 5 cases tuberculosis was stirred up elsewhere.

FRANK DORRANCE

Pathogenesis of Anal Fissure and Implications as to Treatment. Blaisdell, P. C.: *Surg., Gyn. & Obst.*, 1937, 65: 672.

Hypothecating anal fissure as a clinical entity unassociated with any other anal disease is plausible because of the separate and distinct location, the 6 and 12 (clock) positions. Blaisdell states that anal fissures seldom, if ever, extend more cephalad than the intermuscular septum separating the subcutaneous fibres from the superficial fibres of sphincter ani externus. The subcutaneous fibres cause a "raised bar effect" whose anterior surface is more anterior than the plane of the deep and superficial fibres of the external anal sphincter; it is the skin overlying this bar which is the site of anal fissure. Severance of this muscle bar with a wedge-shaped incision and the use of a light pack of vaseline gauze for several days, to allow healing to proceed from the base, is the logical manner of treatment. The factor of non-recurrence is to be taken as the real criterion of successful management and not the fact of healed operative wound. FRANK DORRANCE

ABSTRACTOR'S NOTE.—*Gray's Anatomy* does not concede 3 distinct lobulate divisions of the external sphincter of the anus. It concedes the superficial and deep fibres and corrugator cutis ani. It is presumably to the last named muscular fibres that Blaisdell refers. (Gray's Anatomy), 1935, B.R. Terminology.

Congenital Umbilical Hernia. Jarcho, J.: *Surg., Gyn. & Obst.*, 1937, 65: 593.

This condition is more properly called an eventration; the contents have never occupied the abdominal cavity. One case in which the liver occupied the sac is cited, with the details of operative cure. Operation was performed within 12 hours after birth.

The author quotes Berglas, who states there are two types of umbilical hernia in which early operation is necessary; one has an avascular sac which covers the divergently coursing umbilical vessels; the other has peritoneum as its sac. The first is the commoner and the more dangerous. In both types the sac dries readily, with the probabilities of rupture, infection and death. He considers that a marked disturbance between the growth process of the abdominal cavity and the abdominal contents is primarily the fault (third to tenth week); the other contributory factors are hyperlordosis of the spinal column and anomalies of the mesenteries (ventral and dorsal). The small and large intestine are the more common occupants, but any abdominal viscera may be present. In the case of the liver he hypothecates a laxity of the supporting ligaments. Heredity, pathological persistence of the vitelline duct and defects of the abdominal wall are not accepted as plausible factors of causation.

With the every-day variety of small umbilical hernias not containing an abdominal viscera adhesive plaster repeatedly applied is always successful. FRANK DORRANCE

Obstetrics and Gynæcology

The Prevention of Eclampsia. De Snoo, K.: *Am. J. Obst. & Gyn.*, 1937, 34: 911.

It is probable that the last cause of the defective functioning of kidneys and liver and also of the eclamptic attack is due to vasomotor cramp and the resulting defective circulation. A "cramp centre" is predicated.

There is practically no difference between the Na content of the blood, in gravidas and non-gravidas and in normal and toxæmic women with normally salted food. On a salt-free diet invariably the Na content diminishes, as well in normal gravidas as in toxæmic ones, on an average of 5 per cent. In eclampsia the Na content in most cases is approximately normal, but in other case abnormally high, up to 370 mg. and more. The influence of the salt-free diet on the chlorine content is about the same as on the Na content. The calcium and potassium content on the contrary do not change.

De Snoo allows his pregnant patients to eat any food they like except milk, but all without salt, and an additional litre or two of water. It is his firm belief that salt is the culprit and that it is to blame not merely for the eclampsia but partly also for the toxæmia. It would be well if the women were to be forbidden the use of salt in the second half of their pregnancy.

The figure for eclampsia may still be reduced, and this will be due in large measure to blood pressure control through pre-natal care, which hardly ever fails to give timely warning, and to the salt-free diet. ROSS MITCHELL

Pregnancy Complicated by Ovarian and Parovarian Tumours. Wilson, K. M.: *Am. J. Obst. & Gyn.*, 1937, **34**: 977.

Thirty patients with ovarian and parovarian tumours associated with pregnancy are presented. All but two were operated upon with no maternal deaths. In 5 women, where removal of the tumour involved removal of the corpus luteum, abortion occurred in each instance. Abortion occurred in 3 other instances but the accident was apparently not attributable either to the tumour or the operation.

Torsion of the pedicle of the tumour was found to be a frequent complication, occurring in 20 per cent of the patients in the series. A tumour known to develop during the course of a pregnancy will quite probably prove to be a corpus luteum cystoma. It is suggested that when operation involves removal of the corpus luteum immediate administration of progesterone be begun. ROSS MITCHELL

A Critical Study of 349 Cases of Breech Delivery. Macafee, C. H. G. and McClure, H. I.: *Brit. M. J.*, 1937, **2**: 1112.

This study is based on a series of 349 consecutive breech deliveries occurring in the Royal Maternity Hospital, Belfast, during the years 1932-36. Of the 349 cases 305 were primary breech presentations. Provided that adequate management is available, the extension of the limbs is not regarded as a complication. The corrected fetal mortality in primiparæ is 10 per cent; in multiparæ 3.42 per cent; and in all cases 6.10 per cent. Stress is laid on the value of ante-natal version, but external version should be performed with the greatest gentleness. The Trendelenburg position is of great assistance. The authors describe their method of dealing with the anterior arm. Slow and gentle delivery of the after-coming head is insisted upon to prevent tentorial tears. Breech delivery leads to increased rest to the mother from puerperal sepsis. ROSS MITCHELL

Vitamin E in the Treatment of Habitual Abortion. Currie, D.: *Brit. M. J.*, 1937, **2**: 1218.

In vitamin E we appear to have a means of treating a most distressing condition with some hope of success. Up to the present the amount of vitamin and the length of time it should be administered are open to discussion, but until further observations are made it would appear safer to give it throughout the whole of pregnancy in a dose of not less than three minims of wheat germ oil daily. ROSS MITCHELL

Erythroblastosis Fetalis as a Cause of Infantile Mortality. Javert, C. T.: *Am. J. Obst. & Gyn.*, 1937, **34**: 1042.

Erythroblastosis runs part of its course *in utero*, and its presence may be suspected before delivery. Typically, the mother is a multipara who has made a poor gain in weight during pregnancy, and who gives a history of familial jaundice. Hydramnios may be present with diminished or absent fetal activity. Fetal distress may occur. The amber-coloured fluid when the membranes rupture is important. Analgesics and anæsthetics during delivery are contraindicated. The diagnosis is established after delivery by the deep yellow vernix, or the presence of hydrops, and the presence of erythroblasts in the blood smear and in the fetal capillaries of the placenta. The Wassermann reaction is negative. The incidence of erythroblastosis at the Woman's Clinic of Cornell University Medical College in 1936 was 1 in 400 infants. Resuscitation was necessary in 50 per cent of infants with erythroblastosis. The average red cell count was 3,400,000 per c.mm. and the average hæmoglobin 51 per cent. The mortality was 70 per cent. The treatment was repeated blood transfusions. Within two weeks the nucleated red cells had disappeared. ROSS MITCHELL

Ophthalmology

On Ocular Pemphigus. Kapuscinski, W. J.: *Ann. d'Ocul.*, 1937, **174**: 451.

Ocular pemphigus usually follows pemphigus of the skin, and usually begins at the same time as pemphigus of other mucosæ, particularly buccal and pharyngeal. However it sometimes shows itself as an apparently primary ocular affection.

Four cases are detailed, and are of interest because of the complete clinical picture. The

author concludes that ocular pemphigus is a disease characterized by primary degeneration of the mucosa of the conjunctiva, especially the epithelium. The pathological processes in the cornea are limited to the superficial layer, and may be similar to the changes that take place in the conjunctiva. This chronic inflammatory condition is characterized by a cellular infiltration and is purely a secondary phenomenon which is caused by the invasion by microbes of tissue already pathologically altered by pemphigus degeneration. The article has fifteen illustrative figures and a bibliography.

S. HANFORD MCKEE

The Syndrome of Direct Compression of the Intracranial Optic Nerve. Desvignes, P.: *Ann. d'Ocul.*, 1937, 174: 290.

As indicated by the title this article deals with cases where the optic nerve has been pressed upon by tumour formation, either fibrous or vascular, in the part of the optic nerve just in front of the chiasm. The optic nerve in this part is fixed by its continuity with the chiasm and by the optic canal and the arteries of this region, ophthalmic, outside and below, the cerebral anterior and communicating anteriorly, above. In such a position it cannot escape from pressure as it might do in the orbit where the nerve is surrounded by soft tissue. The result therefore follows that if a tumour begins in this neighbourhood the nerve will soon be compressed and ocular signs will first draw attention to the condition.

The signs of compression of the chiasm are well known, but those of the optic nerve have not been as much studied. In some cases study has placed the diagnosis of a cerebral tumour localized near the optic nerve, and in such cases, if operation has not been too long delayed, patients have escaped rapid blindness and death with great suffering.

The author gives first a historical review of the subject followed by first, clinical signs: (1) vision; (2) visual fields; (3) appearance of the fundus; (4) other ocular symptoms. There is a bibliography.

S. HANFORD MCKEE

Contact Glasses. Bruce, M. G.: *Am. J. Ophth.*, 1937, 20: 605.

The idea of contact glasses occurred first to the younger Herschel, astronomer and physicist, about 1827. Details of his experiments are lacking, but he apparently took gelatine casts of the eye and made from these a gelatine meniscus. It was not until 1911 that Zeiss produced the first ground contact glass, followed in 1912 by a similar glass for use in cases of conical cornea. In 1914, three years after the production of the first ground contact glass, Erggelet suggested their use for aphakia, and later Siegrist advised them for keratoconus, and in 1929 Deutsch called attention to their value in irregular astigmatism. From that date there has been a constantly increasing interest in the subject, which has been stimulated by articles in medical journals and even in the lay press.

The use of contact glasses in overcoming refractive errors is confined largely to myopia. Other suggestions for their use are in the treatment of neuroparalytic keratitis, pemphigus, lagophthalmos. One of the most frequently mentioned disadvantages to their use is the difficulty of inserting them. A very real disadvantage however lies in the wide difference in individual tolerance; also their high price should be borne in mind.

S. HANFORD MCKEE

Neurology and Psychiatry

Sex-linked Microphthalmia Sometimes Associated with Mental Deficiency. Roberts, J. A. F.: *Brit. M. J.*, 1937, 2: 1213.

In 1922, Ash reported a family in which blindness caused by abnormally small eyeballs was inherited according to the same rules of transmission as are colour-blindness and hæmophilia; namely, it affected males in the families and was transmitted to them by their unaffected mothers. Roberts brings this family history up to date, and reports that in the majority of cases the blindness was associated with mental deficiency. The history runs through four and possibly six generations. In the first generation in which the information was definite there were 5 sisters and 3 brothers. Two of the latter were microphthalmic, and one was definitely mentally deficient; he died at the age of 47. His normal twin sister had 12 children of whom 2 boys were blind. Nothing is stated as to their mentality. Two of the 12 children whose history is known were girls, both of whom had affected sons. One girl had 4 sons, 2 of whom were blind, and 1 was at the level of imbecility, the other, of complete idiocy. The other girl had 9 children, 7 of them boys. Four were blind. One of the blind boys was dead, one was feeble-minded, one was an imbecile, and one was definitely above average intelligence.

One of the sisters in the first generation had 2 normal boys and 3 girls. One of the latter had 3 sons affected with blindness and 1 normal daughter, who, in turn, had a blind son mentally normal. The 3 brothers who were blind died at 5 (this one in an epileptic fit, although he was said to be mentally normal), at 18, and at 14, respectively. The last two were idiots and epileptic. Thus in the four generations there were 2 in the first, 2 in the second, 9 in the third and 1 in the fourth who were blind, and 8 of these were definitely known to be mentally defective. None of the members not blind showed any mental defect. This family is unusual in that the microphthalmia is sex-linked, and in that it was so frequently associated with

such marked degrees of mental deficiency, suggesting that in some cases the development defect involved far more of the nervous system than the eye alone. MADGE THURLOW MACKLIN

Therapeutics

Thrombophlebitis of Varicose Veins. Edwards, E. A.: *Surg., Gyn. & Obst.*, 1938, 66: 236.

The author, after active surgical intervention in 63 cases of acute thrombophlebitis in varicose veins, and after biopsy examinations of thrombophlebitic lesions, undertakes a critical analysis of the present conservative treatment of phlebitis. He was unable to find bacteria in the thrombi by stain or culture, unable to find acute inflammatory reaction in the wall of the veins, in the lung after infarction from the thrombotic veins or the development of sepsis after operative procedures. He believes the thrombogenic factors (1) slowing of the blood flow; (2) physical and chemical changes in the retarded and retrograde blood flow; (3) changes in the intima are entirely responsible for the proximal extension, the involvement of perforating and deep veins, and the crippling of the valves, and that ambulatory treatment with elastic bandage support decreases rather than increases the frequency of embolism. Recanalization of firm thrombi is the rule rather than the exception. He advises ligation at the saphenofemoral junction except in those cases of migratory phlebitis which often are an expression of Buerger's disease. The varices can be injected with a 0.5 c.c. injection of 5 per cent sodium morrhuate when the inflammatory reaction has lessened, or ligation of the perforating veins may be performed. The phlebitis usually subsided in these 63 cases within a week; no untoward results prevented return to work within 3 weeks. The cases have been followed from a few months to 5 years without recurrence.

FRANK DORRANCE

Anæsthesia

The Intravenous Use of Morphine Sulphate for Analgesia. Betlach, C. J.: *Proc. Staff Meetings of Mayo Clinic*, 1937, 12: 733.

Morphine sulphate has been used therapeutically for 135 years but it has been only since 1930 that it has been employed intravenously. In Europe it has been administered in this manner for pre-operative medication, for diagnostic purposes and as a therapeutic drug. In America, Dr. Salzer, of Cincinnati, has reported on its intravenous use for gall-bladder colic, angina pectoris, etc.

The effect of the drug given intravenously is more pronounced and comes on immediately as compared with the more delayed action of the subcutaneous injection. The effect lasts about as long as that following subcutaneous injection. Patients vary in their reaction to the intravenous administraiton, some complaining of dizziness, tinnitus, tachycardia and a feeling of warmth. Vomiting is less frequent following this technique.

The method used is as follows. A tablet of morphine sulphate, gr. 1/6 or gr. 1/4, is dissolved in 1.5 or 2 c.c. of sterile water, respectively. This is put in a 2 c.c. hypodermic syringe and a 20 or 22 gauge intravenous needle is attached. After venipuncture the drug is administered very slowly. About 1/24 gr., or 0.25 to 0.33 c.c. of solution, is injected first and twenty to thirty seconds are allowed to elapse. This is to allow for any idiosyncrasy to appear. The remainder of the drug is then injected slowly until the desired effect is obtained.

Intravenous injection of morphine sulphate finds a valuable use in supplementing a waning spinal anæsthetic. Here the injection of 1/6 gr. of morphine will often enable the surgeon to complete his work without resort to supplementary anæsthesia. It is useful as pre-operative medication for regional and local anæsthesia. Traumatic pain and visceral colic respond more rapidly to this method than any other means of administering morphine.

The advantages of the intravenous method over the subcutaneous are: (1) the full analgesic effects are obtained immediately; (2) the drug can be given at the moment it is needed; (3) the dose may be regulated accurately.

F. ARTHUR H. WILKINSON

Obituaries

Dr. Norman Anderson, of Toronto, died on February 17, 1938. He was a graduate of Trinity University, Toronto (1892).

Dr. John Charles Bell, of Merlin, Ont., died on February 9, 1938, in his eighty-first year. He was a graduate of Trinity University, Toronto (1884), and L.S.A. Lond. (1886). He was at one time M.O.H. for the Township of Raleigh.

Dr. Gordon Elliott Booth, of Ottawa, died on March 6, 1938. He was fifty-three years old.

Dr. Booth was born at Waterloo, Que., and graduated from McGill University (1910). He went from there to Manhattan Maternity Hospital, New York, for a post-graduate course. He was attached to the medical and genito-urinary departments of the Ottawa Civic Hospital.

Dr. Joseph Georges Albert Bouvier, of St. Albert, Ont., died on February 12, 1938. He was born in 1882 and a graduate of Laval University, Montreal (1908).

Dr. Joseph Ernest Champagne, of Hull, Que., died on January 25, 1938, aged fifty-seven.

Dr. Champagne was born at St. Norbert, Berthier County, Que., the son of Joseph Aimé Champagne and the late Mrs. Champagne, formerly Miss Esther Marseille. He completed his education in Montreal, where he graduated with his medical degree from Laval University (1907).

Dr. Frank Coleman, of Hamilton, Ont., died on February 8, 1938, in his seventieth year. He was a graduate of the University of Toronto (1894).

Dr. Joseph Aloysius Corcoran, of Montreal, died on March 13, 1938.

Dr. Corcoran was former professor of chemistry at Loyola College, and was born in Stratford in 1878. He was educated at Parkdale College, Toronto, and graduated from Laval University, Quebec, with his B.A. degree, subsequently graduating in medicine at Trinity University, Toronto (1898).

Dr. Riel Hillier, of Leamington, Ont., died on January 19, 1938, aged seventy-three. He was a graduate of Victoria University (1886). He was born at Bath, Ont., on November 5, 1866, of Scotch U.E.L. parentage. He was a veteran of the North-West Rebellion and the Great War where he served with distinction as a combatant officer.

Dr. Daniel H. McCalman, of Winnipeg, died suddenly on March 5, 1938, leaving behind him a record of a singularly active and useful life. For the last few years his health had been indifferent, but apparently he had improved, and on February 1st he was present at the annual meeting of the Sanatorium Board of Manitoba and took part in the discussion.

Dr. McCalman was born near Barrie, Ont., in 1861 and came to Manitoba in 1880. He taught school in Emerson and then graduated in Arts from St. John's College, Winnipeg. He attended Normal School and in 1887 became School Inspector. Eight years later he entered the Manitoba Medical College where he had a brilliant academic career. In 1902 he became Professor of Hygiene in Manitoba College, in 1905 Lecturer in Obstetrics, and in 1907 Professor of Obstetrics, a post which he held for twenty years, then becoming Professor-emeritus. In 1905 he was appointed Obstetrician to the Winnipeg General Hospital and resigned in 1922 when he was appointed a member of the Honorary Consulting Staff.

With his friends Dr. Gordon Bell and Dr. E. W. Montgomery, Dr. McCalman took a keen interest in public health matters and in 1923 he became chairman of the Manitoba Board of Health, with which he was long associated. He was a Past President of Manitoba College of Physicians and Surgeons and a Trustee of the Gordon Bell Memorial Fund. He became a member of the Sanatorium Board of Manitoba in 1930.

His keen mind, singleness of purpose, and devotion to duty made him a very valuable member of the medical profession, both as a teacher and administrator.

Dr. Samuel Russell McCreary, of Belleville, Ont., died on January 28, 1938. He was born in 1893, and a graduate of McGill University (1919).

Dr. Joseph Churchill Patton, of Toronto, Ont., died on February 7, 1938, in his eighty-eighth year. He was a graduate of Victoria University, Cobourg (1888).

Dr. Herbert Henderson Sinclair, of Walkerton, Ont., died on February 1, 1938, in his sixty-ninth year. He was a graduate of the University of Toronto (1894).

Earth is an island ported round with fears;
Thy way to heaven is through the sea of tears.
It is a stormy passage, where is found
The wreck of many a ship, but no man drowned.

—*Francis Quarles*, Epigram 8.

News Items

Alberta

The Alberta Government is making estimates for another Health Unit to be established in 1938, though none was established in 1937, notwithstanding that an amount was placed in last year's budget for it. The sum of $20,500.00 was provided for the care of those afflicted with poliomyelitis, in the hope that the Government assuming the responsibility both for prevention and cure, better results will be obtained.

Since the Government assumed responsibility for prevention and care of those afflicted with the above disease, the costs naturally have mounted. The following figures will indicate the problem.

Government estimates for tuberculosis work, 1933-34, $175,390.00.
Government (full responsibility), 1936-37, $278,618.00.
Government (full responsibility), 1937-38, $333,865.00.
Government (full responsibility), 1938-39, $370,904.00.

Thus the amount has doubled since the Government's assumption of what is called full responsibility, though nothing is being assumed regarding tuberculosis of bone.

The Workmen's Compensation Act is being revised, and the officers were planning to have a finality to certain compensation claims, like final settlements with insurance companies. The men, however, will have none of this arrangement. The workmen desire an appeal from the decision of the physician in charge of the case, to an Appeal Board of Physicians, but if the decision of this Board is not accepted by the injured workman he wants the right to go before a Lay Appeal Board composed of three men, as follows. The Attorney-General of the Province, a man chosen by the workman, a man chosen by the industry. Nor is the workman willing to be bound by the decision of this Appeal Board; he wants a further appeal to the Workmen's Compensation Board itself.

Chiropractors are demanding that their cult be named in the Bill, indicating that their system of healing be legally recognized in Alberta, and should be put on an equal footing with the medical profession. They are asking for four chiropractic referees, and that the workmen have the right to call a chiropractor at the initial stage, and the Board have no power to change the treatment.

Amendments are being made to the Act with the object of restricting the sale of codeine and sulfanilamide and their salts. The poison list is being amended by including with potassium cyanide all other metallic cyanides.

The annual banquet of the Calgary Medical Society was held at the Renfrew Club on February 8, 1938. The President, Dr. A. I. Danks, was Chairman. The address of the evening was given by Major Donald Cameron, Librarian of the University of Alberta. Other speakers were Mayor Andrew Davison, Dr. C. F. Bunn, of Red Deer, President-elect of the Canadian Medical Association — Alberta Division; Dr. W. L. Williamson, representing the Edmonton Academy of Medicine; Dr. R. R. McIntyre, the Calgary Dental Society. A pleasing feature was the presentation of illustrated addresses to Dr. W. A. Lincoln and Dr. A. B. Singleton for the splendid services they have given the city on the City Council and the Public School Board. Dr. Euston Sisley, who has been in active practice in Calgary for the past thirty-four years, was made a life member of the Society. Dr. E. B. Roach made the presentations.

G. E. LEARMONTH

British Columbia

In a speech before the Vancouver Institute in February, the Hon. G. M. Weir, Minister of Education, stated that he wished to see an institute of preventive medicine established in connection with the University of British Columbia in the near future.

The Prince Rupert Hospital Board has called for tenders for the proposed new $100,000.00 hospital unit. The plans and specifications have been received from the provincial architect, and call for a three-storey reinforced concrete building, fireproof, and fully modern.

Directors of the Chilliwack Hospital Board are seeking a provincial grant toward a proposed new $80,000.00 hospital building.

At the annual meeting held recently it was announced to the directors of the Kelowna Hospital Society that a new wing for the Kelowna General Hospital, costing from $50,000.00 to $100,000.00 was immediately necessary.

The Vancouver Municipal Chapter, Imperial Order Daughters of the Empire, has presented a bronchoscopic room fully equipped to the Vancouver General Hospital in commemoration of the Coronation of their present Majesties. This represents a contribution of $2,500.00.

Dr. Allon Peebles, chairman of the at present non-functioning British Columbia Health Insurance Commission, has left for a three months' European tour. He will visit England, Scotland, France, Germany, Denmark and Norway, all of which countries are stated to have health insurance systems in operation, in order to make a first-hand study of European health insurance.

The British Columbia and Alberta divisions of the Canadian Association of Radiologists met in Victoria on February 4th and 5th. It is hoped that this may become the first of a series of annual conferences to be held alternately in the two provinces.

Wm. H. Walsh, hospital consultant architect of Chicago, has been invited by the Board of the Vancouver General Hospital to come to Vancouver to confer with Mr. Whittaker, the provincial architect, on plans for a new building for acute cases. D. E. H. CLEVELAND

Manitoba

The Rockefeller Foundation has agreed to make a large contribution to initiate a survey into general morbidity statistics in the municipalities having municipal doctors. The area covered is rural, with an approximate population of 15,000 and containing groups of various national origins. The survey will be carried out over a two-year period. It is proposed to use statistic forms similar to those in use in collecting data in connection with the medical care of the unemployed in the City of Winnipeg, and a similar method of computing the figures by means of the Hollerith system will be adopted.

In conjunction with this study of illness a study of all pregnancies in Manitoba during the course of a year will be carried on simultaneously by the same personnel. Material for this study will be obtained by the use of forms to be completed by the attending physician. The organization is to consist of a special medical officer with statistical knowledge, two public health nurses, one with statistical knowledge, and an office clerk. The direction of the study is to be under the Department of Health and Public Welfare of the province. The Dominion Department of Pensions and National Health has agreed to make a contribution towards defraying the costs of this survey. The co-operation in this survey by the Manitoba Medical Association is to be considered merely as insurance against the initiation of some form of state health insurance passed on inadequate knowledge.

When this survey is completed there will then be available information with regard to morbidity statistics among a large urban population in Winnipeg in connection with medical care of the unemployed which has been carried on since 1934, and also among representative medical groups and statistics as to maternity in the province together with the valuable mortality statistics. These should form a valuable body of medical statistics.

At a special convocation of the University of Manitoba held in the Concert Hall of the Winnipeg Auditorium the honorary degree of Doctor of Laws *honoris causa* was conferred on Elmer Verner McCallum, Ph.D., Sc.D., Professor of Biochemistry, School of Hygiene and Public Health of the Johns Hopkins University. Dr. McCallum delivered the Gordon Bell Memorial Lecture, on "Some Practical Applications of Nutrition".

Winnipeg General Hospital is advertising for applications for the position of Assistant Gynæcologist and Assistant Oto-laryngologist.

A meeting of the Sanatorium Board of Manitoba was held at the St. Boniface Sanatorium on March 11th. Dr. J. D. Adamson, Superintendent of St. Boniface Sanatorium, reviewed the work of the past year.

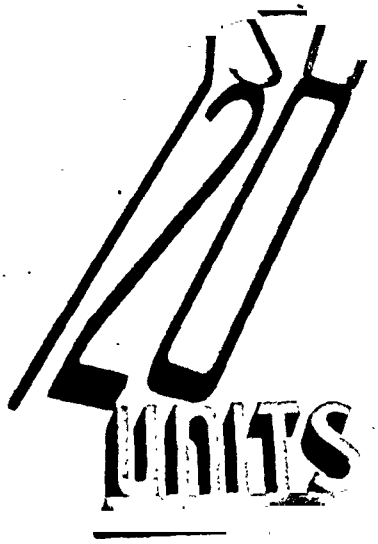
The institution has been run to almost full occupancy as regards adults and about 60 per cent occupancy for children. The average length of stay for all cases was 288 days; for cases of pulmonary tuberculosis 320 days. It was noted that the percentage of far-advanced cases among males was higher than for females, 73 per cent as against 65 per cent. The table showing the age on admission demonstrated the comparative incidence of pulmonary tuberculosis before the age of fifteen and its very heavy incidence between 20 to 35 years, especially in females. During the 5 to 15 age-period there is very little pulmonary tuberculosis that requires treatment, but the incidence of bone tuberculosis is highest during this period. Females show preponderance before the age of 35 and a gradual decreasing preponderance thereafter. These facts on age-incidence indicate that main efforts should be directed to adolescents and in adults rather than to children. In young adolescents tuberculosis is more than twice as common among females but at the age of 50 or over it is more than four times as common among males.

In the St. Boniface Sanatorium surgical methods are being extensively used for treatment. Nearly 64 per cent of cases received surgical treatment. One hundred and fifty major surgical operations on tuberculous patients were done with only one death during the year. In connection with the Sanatorium there is a Respiratory Clinic at St. Boniface Hospital with an interlocking staff. This outpatient clinic is a great assistance to the Sanatorium.

Since the opening of the Central Tuberculosis Clinic in Winnipeg and the St. Boniface Sanatorium the death rate from tuberculosis in Winnipeg has declined considerably, from an average of about 55 per hundred thousand during the years 1924 to 1929 to 30 per hundred thousand during 1936.

Headed by Dean A. T. Mathers, 29 members of the Faculty of Medicine, University of Manitoba, left Winnipeg on February 26th for Chicago. The purpose of the visit was to confer with heads of departments in the Faculty of Medicine of the University of

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Chicago. The majority of the party returned on March 3rd feeling that the visit had been most profitable.

The visit of Dr. Fulton Risdon, of Toronto, as guest speaker at the post-graduate course in Traumatic Surgery was greatly enjoyed. ROSS MITCHELL

New Brunswick

Captain Charles McMillan, R.C.A.M.C., has been transferred from the general list to Command No. 7, Hygiene Section.

Justice J. H. L. Fairweather, of Saint John, has consented to become the Chairman of the New Brunswick Branch of the Canadian Society for the Control of Cancer. Organization of this provincial branch is coming forward under a select committee.

Dr. J. K. Sullivan was the speaker at the monthly meeting of the Saint John Medical Society on March 2nd. Dr. Sullivan discussed a wide field of renal and ureteral diseases. The attendance was satisfactory, and his presentation of lantern slides, demonstrating the various lesions described, was much appreciated.

Dr. E. C. Menzies, Superintendent of the Provincial Hospital, appeared before the Fredericton Medical Society at their monthly meeting in February and spoke on the subject of "The early mental case in general practice".

Dr. D. C. Malcolm, of the surgical staff of the Saint John General Hospital, has been confined to hospital for some time, suffering from a severe infection of the face.

Two delegations from the New Brunswick Medical Society have recently appeared before the Provincial Government in protest against restrictive regulations issued by the Workmen's Compensation Board. These regulations limited the hospitalization of certain types of injuries to a degree that disallowed the judgment of the physician in charge of the case. The reception of these committees by the Government resulted in satisfactory arrangements being made.

The New Brunswick Medical Society has decided to eliminate their scientific sessions from their annual meeting for the year 1938, so as to allow their members more freedom to attend the meeting of the Canadian Medical Association in Halifax. Their business meeting will be held in September at Edmundston, and will occupy only one day.

The reports of the local boards of health mark a very definite decrease in the amount of infectious diseases reported during the first two months in 1938, as compared with the same period in 1937.

It is anticipated that in the very near future very extensive repairs and additions will be made to the Saint John Tuberculosis Hospital, which for some time has been filled to capacity, necessitating the creation of a waiting list of recommended patients to this institution.
A. STANLEY KIRKLAND

Nova Scotia

In the speech from the throne at the opening of the Nova Scotia Legislature it was brought out that the health of the province had been well maintained through 1937, there being no serious outbreaks of disease and no severe epidemics. Of particular interest, it was said, was the formation of a health unit for Cape Breton Island. An annex for the tuberculous was erected in connection with the Amherst Hospital and the government felt "that in local communities the extension of the Annex principle will be of great assistance in dealing with tuberculosis." The total number of deaths from tuberculosis was reported as being reduced during 1937.

At the annual meeting of the staff of the Halifax Infirmary, Dr. W. G. Colwell was elected president, Dr. F. S. Findlay, vice-president, and Dr. C. M. Jones, secretary.

Dr. G. A. MacIntosh, Superintendent of the Victoria General Hospital, Halifax, has gone to Florida for a vacation and well earned rest. His post at the hospital is being taken by Dr. H. L. Scammell, of the Workmen's Compensation Board.

The freighter, *City of Auckland*, docked at Halifax from Calcutta with a case of small pox on board, and kept port physicians busy vaccinating both the crew and dock attendants who came in contact with the ship.

Dr. H. R. Corbett, late roentgenologist to the Kentville Sanatorium, has taken up his new appointment to St. Rita's Hospital in Sydney and St. Joseph's Hospital in Glace Bay. His presence will be a great adjunct to the services of these hospitals.

Dr. Hugh Martin has been appointed town health officer for Sydney Mines.

More than 6,500 persons were treated at the Dalhousie Health Centre during 1937. This clinic has been growing from year to year since its inception, and this latest figure represents a substantial increase over that of the previous year.

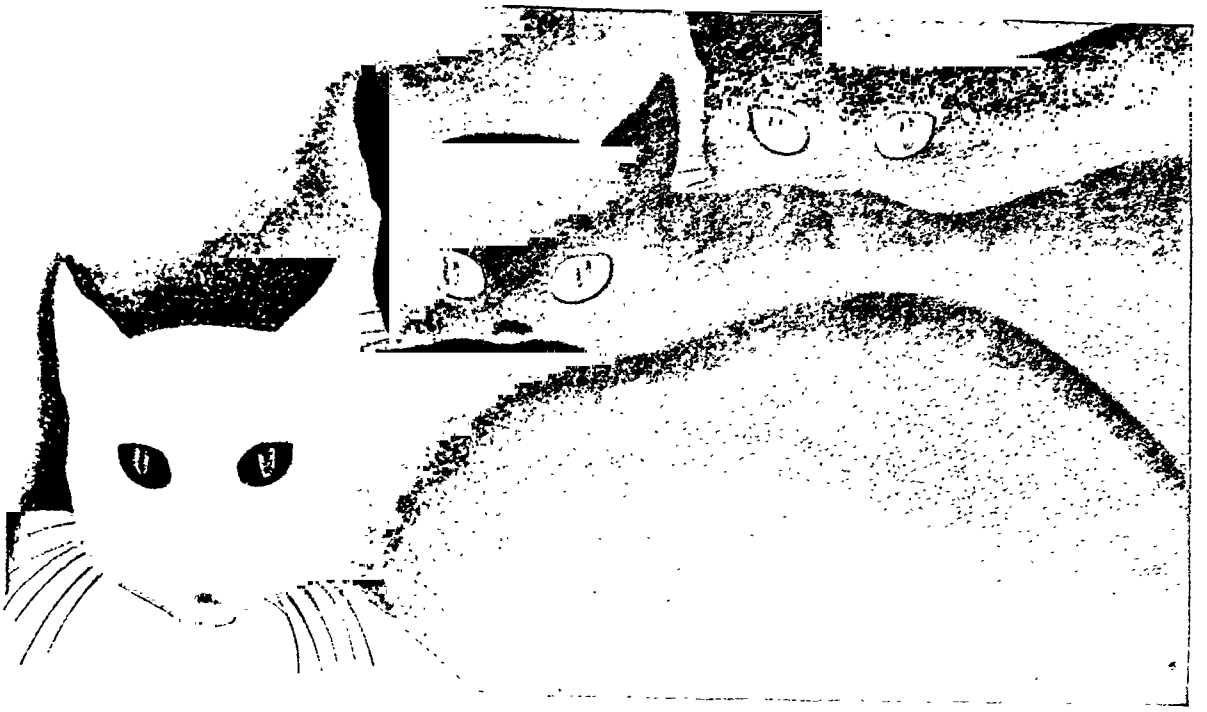
Dalhousie University will add to its buildings a new medico-dental library before the beginning of next term. Already the University has had expert advice from outstanding medical librarians of this continent. Plans have been drawn and it is expected that the corner stone will be laid this month. The new library will cost somewhere in the vicinity of $100,000.00 and will fill a much needed want, not only among medical and dental students of Dalhousie but among physicians of Halifax and Nova Scotia as well.
ARTHUR L. MURPHY

Ontario

The Committee in charge of the McGibbon Memorial Fund which is being raised to perpetuate the name of Doctor Peter McGibbon, physician, parliamentarian, and soldier, in connection with the Bracebridge General Hospital, reports that to date the fund stands at about $5,000.00. With the amount asked for well in sight, tenders are now being called for by the Bracebridge Branch of the Red Cross Society for the construction of a new wing for the hospital and the installation of an elevator sufficiently large to accommodate a stretcher and an attendant.

Dr. Charles W. Clark, who celebrated his 93rd birthday in February, is probably the oldest medical practitioner in Toronto. Doctor Clark was born at Ingersoll, and was, for some time, in practice in Winnipeg. He is still quite active.

The Academy of Medicine, Toronto, have under preparation a special number of the Academy *Bulletin* to mark the 50th anniversary of the Ontario Medical Library Association. The Ontario Medical Library Association was one of the four medical societies which merged thirty years ago to form the Academy



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of Medicine, Toronto. The library, at that time, consisted of from 4,000 to 5,000 volumes. In thirty years, it has grown to nearly 28,000 volumes.

New legislation of interest to physicians is announced by the Honourable Minister of Health. He proposes:

1. An amendment to the Private Hospitals Act prohibiting the use of the word "hospital" by any institution that is not of a standard approved by the Department, in fact, any private institution that is not licensed under the Act. "Rest Homes" unless so licensed by the Department may no longer call themselves hospitals or private hospitals.

2. Another bill introduced by the Minister is in the form of an amendment to the Nurses Registration Act. This will bring all training of nurses under the direct supervision of the Minister of Health. No training school may be established in the province without specific approval of the Minister.

3. Another measure introduced by the Honourable Mr. Kirby extends the provisions of the War Veterans Act which provides for the burial of indigent veterans. This will now include veterans of air service as well as military and naval veterans; also veterans of all wars instead of only those of the Great War.

On the evening of February 23rd, the Ontario County Medical Society presented four of their members with Life Memberships, Dr. D. S. Hoig, Dr. T. E. Kaiser, Dr. C. F. McGillivray and Dr. D. Archer. All of these men have been prominent in the medical and civic life of Ontario County for from forty to fifty years or more. Doctor McGillivray was for two years President of the Ontario (provincial) Medical Association.

Doctor William Boyd, Professor of Pathology, University of Toronto, lectured before a large audience in Convocation Hall on Saturday, February 26th, on the subject of "Cancer".

Owing to increased demands being made upon the laboratory of the Provincial Department of Health the Deputy Minister has asked that a new laboratory be built on the site now occupied by the Ontario Hospital, Queen Street West. At present, the work is being carried on in the Whitney Block of the Parliament Buildings.

There was an unusually large attendance at the annual dinner of the Ottawa Medico-Chirurgical Society on Thursday, February 17th at the Royal Ottawa Golf Club. The guest speaker was Colonel A. T. Thompson. Mention was made of the special way in which the Society had been honoured in having one of its members President of the Ontario Medical Association and another President of the Canadian Medical Association during the same year.

Some years ago, Doctor H. B. Small, of Ottawa, was presented with a gold-headed cane by the Ottawa Medico-Chirurgical Society on the golden anniversary of his admittance to the practice of medicine. In the eight years since this replicas have been given to other physicians attaining the same distinction. Doctor Small has returned the cane and, in future, it will be hung in the hospital with which the recipient is affiliated during his tenure of the distinction.

Doctor H. J. Stander, Professor of Obstetrics and Gynæcology, at Cornell University Medical College, New York, lectured before the annual meeting of District No. 11 of the Ontario Medical Association at the Academy of Medicine on March 1st, and before a meeting of District No. 4 of the Ontario Medical Association held under the auspices of the Hamilton Academy of Medicine at McMaster University on March 2nd.

J. H. ELLIOTT

Quebec

The Montreal Convalescent Hospital reports a very successful year. A new wing is well under way, and its construction has been hastened by the promise of a grant of $200,000 from the Provincial Government.

Statistics for the year 1937 revealed that private or semi-private patients numbered 191, public pay patients 221, patients accepted or pending under the Quebec Public Charities Act 1,051, free patients, 124. The total number of patient-days was 38,548 or an average of 24 days per patient, and the average cost per patient per day was $1.69.

The nationalities of the patients admitted were as follows: English-Canadians, 812; French-Canadians, 128; British Isles, 387; Newfoundlanders, 19; Russians, 43; Americans, 30; Central Europeans, 94; Northern Europeans, 37; Southern Europeans, 23; Chinese, 4; Indians, 3; and Syrians, 2.

The guest-speaker at the Annual Meeting which was held on February 22nd, was Dr. W. W. Chipman, who gave a striking address. He traced the history of the hospital since its inception in 1913, and pointed out that the care of the convalescent was a special business which required a carefully selected staff with special training and experience.

The new wing, made possible, thanks to the generous aid of the Provincial Government, Sir Charles Lindsay, Mr. Herbert Molson and Mr. J. W. McConnell, adds 116 beds to the original capacity, making in all an institution of 225 beds. The hospital in the future will devote much more attention to vocational therapy. Dr. Chipman pointed out the economic gain in having a well-equipped convalescent hospital. The average cost at the Montreal Convalescent Hospital was only $1.69 per patient per day, as compared with the $4.00 of the general hospitals. The foundation of all care of convalescent patients, is rest, appropriate rest for mind and body; fresh air; good food; proper environment.

The International Council of Ophthalmology is a body which represents the civilized nations of the world in the domain of ophthalmology. It acts between Annual Congresses as a directing and legislative body. On the Council are two representatives from the United States and two from Great Britain and the overseas Dominions. This year it is announced that Professor Sinclair, of Edinburgh, will represent Great Britain, and we are glad to state that Prof. Fred. T. Tooke, of Montreal, will represent the latter.

Dr. B. P. Babkin, Research Professor of Physiology, McGill University, has been invited by the Board of Physiology of the University of London, England, to lecture there during the spring session. Dr. Babkin will deliver two lectures, which will be based on the researches carried out by himself and his co-workers at McGill University during the last few years. In the first lecture he will discuss "The regulation of the activity of the gastric glands" and in the second "Trophic and secretory phenomena of the digestive glands". Later he lectures in Edinburgh.

Dr. Norman Bethune, of Montreal, who organized the Spanish-American blood transfusion services in aid of the Spanish loyalists, is reported to have been in Hankow recently with the first of many combined Canadian and American units to work in the front lines with the Chinese army.

Saskatchewan

The Osler Night was celebrated by the Regina and District Medical Society with a dinner at the Hotel Saskatchewan on Wednesday, February 16th. Dr. H. E. Alexander, of Saskatoon, gave an address on the life of Osler.

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Dr. B. Brachman, of Regina, who left here last July, received a fellowship of the St. John's Hospital Dermatological Society, with which is incorporated the London Dermatological Society, at the annual meeting held recently in London, England. LILLIAN A. CHASE

United States

The Francis Amory Septennial Prize of the American Academy of Arts and Sciences.—In compliance with the requirements of a gift under the will of the late Francis Amory of Beverly, Mass., the American Academy of Arts and Sciences announces the offer of a septennial prize for outstanding work with reference to the alleviation or cure of diseases affecting the human genital organs, to be known as the Francis Amory Septennial Prize. The gift provides a fund, the income of which may be awarded for conspicuously meritorious contributions to the field of knowledge "during the said septennial period next preceding any award thereof, through experiment, study or otherwise . . . in the diseases of the human sexual generative organs in general." The prize may be awarded to any individual or individuals for work of "extraordinary or exceptional merit" in this field.

In case there is work of a quality to warrant it, the first award will be made in 1940. The total amount of the award will exceed ten thousand dollars, and may be given in one or more awards. It rests solely within the discretion of the Academy whether an award shall be made at the end of any given seven-year period, and also whether on any occasion the prize shall be awarded to more than a single individual.

While there will be no formal nominations, and no formal essays or treatises will be required, the Committee invites suggestions, which should be made to the Amory Fund Committee, care of the American Academy of Arts and Sciences, 28 Newbury Street, Boston, Mass., U.S.A.

General

The Sixty-seventh Annual Meeting of the American Public Health Association will be held in Kansas City, Mo., October 25 to 28, 1938.

Dr. Edwin Henry Schorer, Director of the Kansas City Health Department, has been appointed Chairman of the Local Committee. He will be assisted by a large group of city and state officials and community leaders.

A long list of affiliated organizations meet habitually with the American Public Health Association. They include: the American Association of School Physicians; the Association of Women in Public Health; the Conference of State Laboratory Directors; the Conference of State Sanitary Engineers; the American Association of State Registration Executives; Delta Omega; the International Society of Medical Health Officers.

The attendance at the 67th annual meeting will include public health workers from every State in the Union, Canada, Cuba and Mexico.

The Third International Cancer Congress, under the auspices of the International Union Against Cancer, will be held in the United States, September 11 to 16, 1939, at the Haddon Hall Hotel, Atlantic City, N.J. The President of the Congress is Professor Francis Carter Wood, Director of the Institute of Cancer Research of Columbia University, New York City; Dr. Donald S. Childs of Syracuse, New York, is the Secretary-Treasurer: and Dr. A. L. Loomis Bell, of Long Island College Hospital, Brooklyn, N.Y., is in charge of transportation and exhibits.

The proposed sections are as follows: general research; biophysics; genetics; general pathology of cancer; surgery of cancer; radiological diagnosis of cancer; radiotherapy of cancer; statistics, and education. Further details concerning section chairmen, committees and other data will be announced later.

The membership fee will be $15. All inquiries should be addressed to the Institute of Cancer Research, 1145 Amsterdam Avenue, New York, N.Y.

Book Reviews

The Collapse Therapy of Pulmonary Tuberculosis. John Alexander, B.S., M.A., M.D., F.A.C.S. 675 pp., illust., $15.00. Thomas, Springfield, 1937.

Written by a leading thoracic surgeon who has had much experience and has studied extensively in many of the leading thoracic clinics on this continent and abroad, this book should have a special appeal to those so interested. At the same time, so universal is the need for a constructive attitude in treatment of pulmonary tuberculosis that it could well have a place in the current reading of the physician and the general practitioner. The author has brought to view that hazy therapeutic region between prolonged rest treatment and thoracoplasty, and has shown that it can be utilized with good advantage to the patient in lessening the period of disability and the extent of parenchyma involved, by other surgical measures of proved value.

Pneumothorax, phrenic nerve paralysis, scaleniectomy, scaleniotomy, oleothorax, closed and open intrapleural pneumonolysis, multiple intercostal nerve paralysis, extrapleural, suprapleural and subcostal pneumonolysis, and the various degrees and types of thoracoplasty are considered fully. One of the several collapse measures should be given consideration even in the minimal stages.

Operative Surgery. M. Kirschner, vol. 3, Ear, Air Passages and Neck. 528 pp., illust., $13.00. J. B. Lippincott, Montreal, 1937.

The book is divided into two main parts. The first deals with surgery of the ear, nose and throat including the larynx and tracheobronchial tree, and the second part with the surgery of the œsophagus and neck.

In part one the standard operations dealing with disease in the ears, nose and throat are fully described and freely illustrated. One is impressed by the fact that the techniques described are those which have been devised and which are in common use in Europe. Very little reference is made to modern surgical procedures which have been devised and are in common use in America. Many of these shortcomings, however, are pointed out and are in part rectified by the American editors.

In the chapter devoted to disease of the ears, some space has been devoted to plastic surgery. The operations upon the lateral sinus are generously illustrated. In describing the so-called simple mastoid operation, the technique is somewhat more extensive and more radical than that usually carried out in America. A considerable amount of space is devoted to describing radical external operations upon the sinuses. These are well illustrated. The modification of the external sinus operation devised and popularized in America by Lynch, Sewell, Ferris-Smith, and others is not described.

The second part of this book, "Operations on the Œsophagus and on the Neck", includes œsophagoscopy and many external operations, such as the removal of a cervical rib, torticollis, and methods of exposure and operations upon the most important arteries and nerves of the neck. The various types of

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"*In skull examinations, by adapting the technic* [*radiographic*], *a fracture may be demonstrated, the existence of which would otherwise not be suspected.*"—RADIOLOGY, *18*:320, Feb., 1932

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pharyngotomy are described, including the classical but somewhat obsolete method of Kronlein. There is a chapter on operations on the thyroid and thymus, which describes very fully the operation for sub-total thyroidectomy, but the translators differ quite frequently from the author, as exemplified by the frequent passages between parenthesis.

The scope of the book is somewhat unusual and it would appear to be of more value to the general surgeon than to the specialists in the different fields. It would be a definite aid to anyone contemplating surgical procedures in any of the areas described because the instructions and directions are good and the anatomy well described, with illustrations which are clear and liberal in number.

Practice of Orthopædic Surgery. T. P. McMurray, M.B., M.Ch., F.R.C.S. 471 pp., illust., $6.25. Macmillan, Toronto, 1937.

The subject matter of this book is largely the result of the author's experience, and his object, as stated in the preface, is to give the reader the basic principles of treatment in orthopædic surgery. The author has been successful in doing this, but has paid less attention to etiology, pathology and symptomatology than one might wish. Many orthopædic surgeons on this continent particularly will differ with him as to the rôle of operative fusion of tuberculous joints in children, since here the trend is more and more towards operative fixation in children as well as adults as soon as the general condition of the patient warrants such a procedure. The author recommends operative fixation in children only after prolonged conservative treatment has failed to give firm ankylosis. Many surgeons would also strongly dissent from his advice to correct deformities of tuberculous joints by manipulation under general anæsthesia, even though the author states that he has never seen any evil effects therefrom.

The author rightly believes the diagnosis "Low Back Pain" to be slovenly. However, in dealing with the baffling problem of pain in the low back, he leads one to believe that if the pain is not due to intra-pelvic or intra-abdominal conditions, it is due to a strain of either the lumbo-sacral or sacro-iliac articulations, and further that these two conditions can be readily differentiated, and will respond to certain treatment. That the problem is not so simple as this is evidenced by the voluminous literature on the subject, the countless methods of treatment advocated, and one's own experience. The book is well illustrated.

Injuries and Diseases of the Hip. F. H. Albee, M.D., LL.D., F.A.C.S. and R. L. Preston, M.D. 298 pp., illust., $5.50. Hoeber, New York, 1937.

Dr. Albee's book on "Injuries and Diseases of the Hip Joint" should prove of definite value to all of those who are interested in hip-joint surgery. The chapter describing the armamentarium necessary and plaster of Paris technique is rarely found so clearly and accurately described. Probably because of his unusual ability to use the electrical saw, he tends to over-emphasize major surgical procedures, when simpler and more conservative procedures might be safer for the average surgeon to use. The chapters dealing with fractures and dislocations are particularly well done. There seems to be a slackening of interest in the final chapters, including that on tuberculous disease of the hip joint. All in all, the book is very well written, the pictures are good, and it is very easy to read.

Eyestrain and Convergence. N. A. Stutterheim, M.D.(Rand.). 90 pp., illust., 7s. 6d. H. K. Lewis, London, 1937.

The object of this book is to show general practitioners and ophthalmologists how to deal satisfactorily with eye-strain. The book is small in size, but not small in importance.

The author lays down the following postulates, among others. The actual primary position of the human eyes is not one of parallelism but of divergence. This primary position is firmly fixed and possesses positional stability and perfect elasticity. The extrinsic eye muscles act as tensors, and not antagonistically. Convergence is regarded as representing an autonomic power of the mind (or brain), which manifests itself as the basic movement of the dual eye and forms the kinetic principle of bifoveal single vision. This convergence acts by visual reflexes only, and not through volition, nor with the assistance of consciousness. Convergence is independent of the action of the musculi recti interni, superiores and inferiores, and the musculi obliqui.

The author remarks that eye-strain, so far, has been universally treated by means of spectacle glasses; "errors of refraction" may often complicate eye-strain but they are never the true cause of it. Yet, he admits that well-chosen glasses are very necessary in many cases of errors of refraction. His subject, however, goes beyond the question of the improvement of "visual acuity"; it is the diagnosis and cure of "eye-strain". His views as to this part of the matter may seem, at first sight, to be heretical but are based on sound physiological and anatomical facts, and seem to receive their vindication in the excellent results that he has obtained from his method of treatment.

His line of treatment consists in measures (by the use of prisms) designed to improve the power of convergence. It is not enough, however, for the patient to have a power of convergence sufficient to bring his eyes into a condition of orthophoria at reading distance; he must have sufficient reserve power to be able to overcome the diplopia produced by prisms up to 50° base out in front of the eyes in distant vision.

A table is given of 100 typical cases and details of 19 selected cases which show the efficacy of the author's treatment, which he admits is tedious and exacting.

This book deserves a wide circulation. The views propounded in it will be novel to many, but the author seems to have made out a good case for his conceptions. It should stimulate investigation of this important matter.

Pathology. E. B. Krumbhaar, M.D. Clio Medica Series No. 19. 206 pp., illust., $2.00. Hoeber, New York, 1937.

This book covers in a succinct manner the development of the idea of pathology from the earliest eras, when it was practically non-existent, emphasizing the Galenic influence down the centuries, to the sixteenth, when Vesalius in "De Humani Corporis Fabrica" created a new conception of anatomy and laid the foundation of the superstructure of pathological anatomy and systematic gross pathology developed in the following two centuries by Bonetus, Morgagni, Baillie, etc. This occupies the first four chapters. The next two discuss the initiation of the idea of specific tissue pathology, noting the various anatomists and clinicians concerned, and its culmination in the epoch-making work and publications of Virchow, "the Father of cellular pathology". Chapter VII deals with the integration of the "pathology" concept to include the fusion and correlation of the "structural, functional, chemical, experimental and clinical methods of approach"—in other words continues the discussion of the trend in investigation of disease processes to the present day method in which all available information, clinical and laboratory, is collected and analyzed. The final chapter of the book proper gives an interesting special description of the historical phases of the study of inflammation and cancer.

This is a worthy addition to this admirable series of books which are not expensive and should be in the library of every physician interested in the history of his craft.

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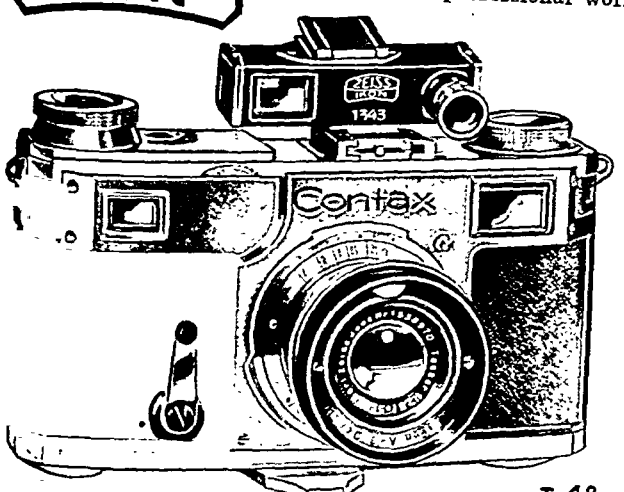
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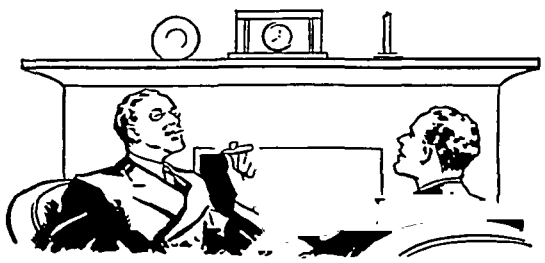
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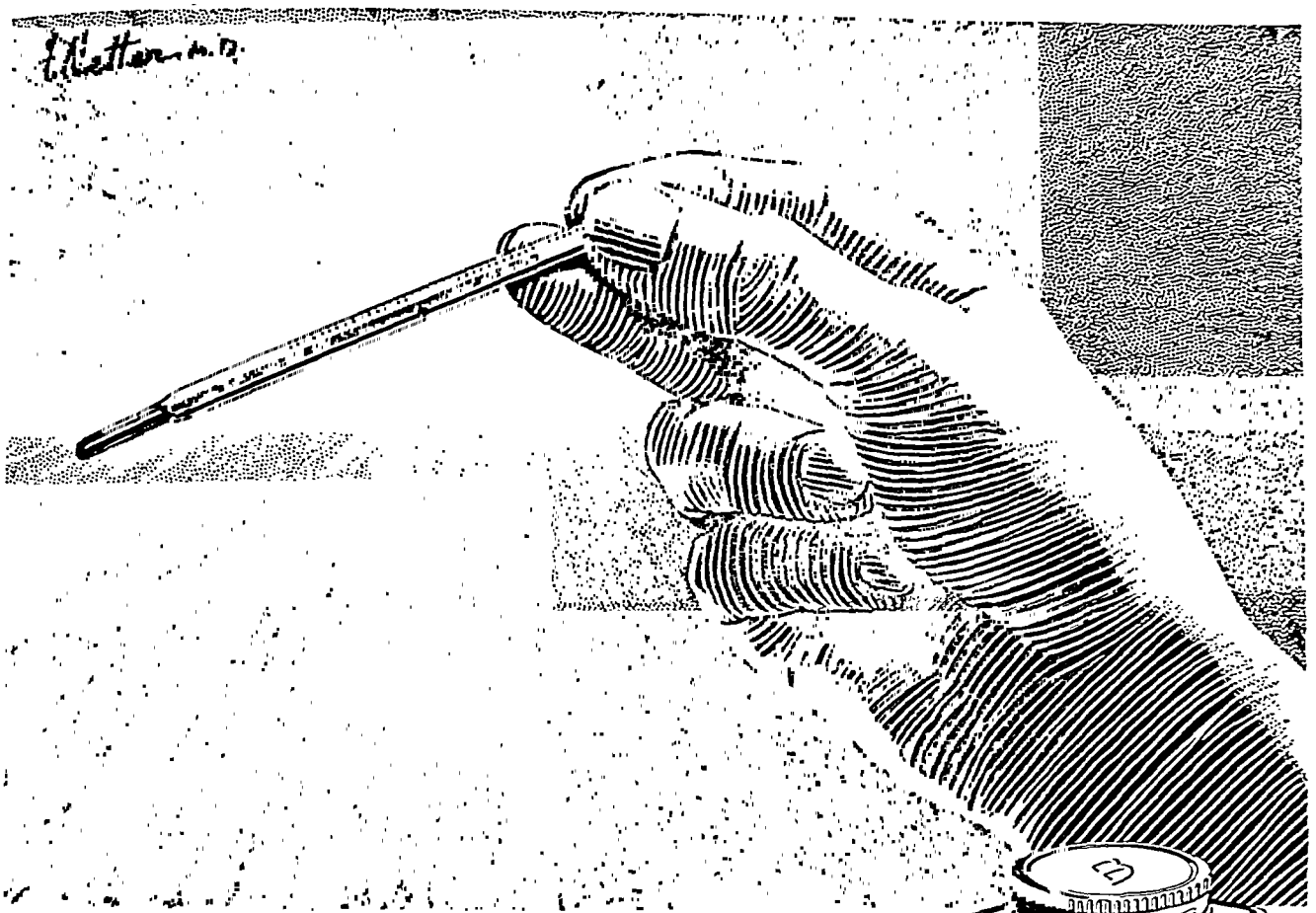
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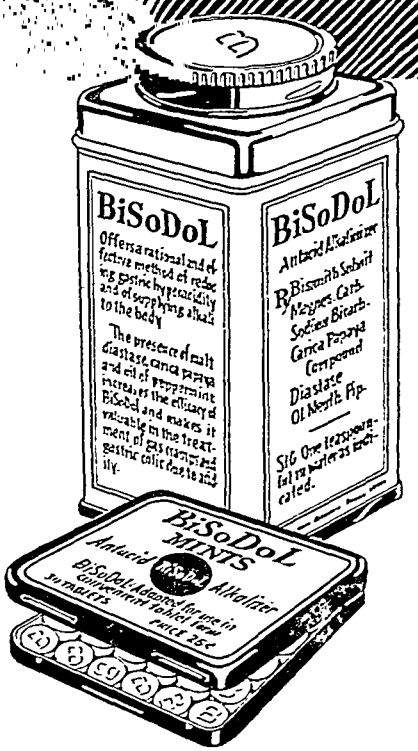
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"Fortunately, our doctor recommended Cow & Gate Lacidac and Daltose. Now Robert is a well developed, happy child, the picture of health, weighing 24 lbs. 9 ozs., is 30 inches high, has 4 teeth, and toddles alone—strong, vigorous and content."

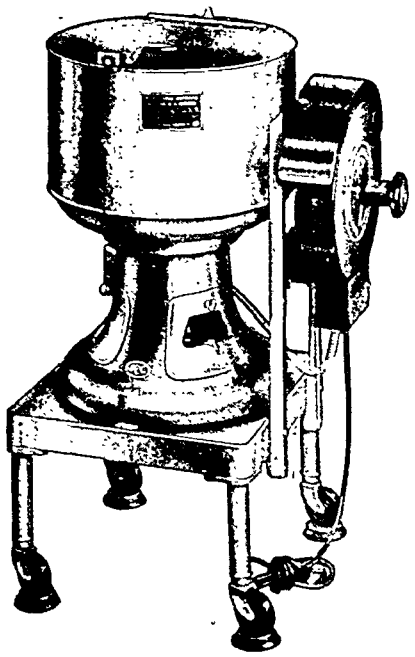
The above is an extract from a letter dated November 17, 1937, received unsolicited from Mr. and Mrs. Claude Lacelle, of 150 Dalhousie St., Ottawa, Ont.

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Size 1, Type SB Centrifuge with Stand

Ideal for Research—
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The International Size 1, Type SB Centrifuge is particularly suited for the busy research laboratory because of its adaptability to the exacting and various demands of this work. Due to its efficiency at high speeds and power for large capacities, this model is most popular with research workers. The regular "Size 1, Type SB" may be **reinforced** with an all welded steel enclosing guard (as shown here) for safety when operating at the very high speeds obtained with the **Multispeed Attachment.** The portable stand provides sufficient stability and the convenience of an easily movable unit, without the expense of a permanent mounting.

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are furnished in many types and sizes, all of the finest materials and designed, so far as possible, to allow for future adaptation of improved accessories as developed by the new principles of advanced technique.

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First, a smooth laxative effect for which Phillips' has been well known for over sixty years.

Secondly, its high acid-combining power.

For convenience and to assure regular dosage for the ambulant patient—Phillips' Milk of Magnesia Tablets. Each tablet equivalent to a teaspoonful of Phillips' Milk of Magnesia (liquid).



DOSAGE:

As an antacid: 2 to 4 teaspoonfuls (2 to 4 tablets).
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We will send you professional package upon request.

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This "See Your Doctor" campaign is running in *Maclean's* and other leading magazines.



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MANY a business man pictures himself as a sort of modern Atlas—supporting the fate of the world on his shoulders.

He sincerely regards his work as indispensable to the success of the business, and recoils from anything that he feels might take him away from his job.

That's why it usually is so difficult to get such a man to pay proper attention to his health, even though he is troubled by persistent signs and warnings that something is wrong.

For at any suggestion that he heed these warnings—that he see his doctor—he says: "Yes, yes, I suppose you're right. But what if the doctor should order me to stop work for awhile? Who'd take care of my job? What would happen to the business?"

And the irony of it is that by his attitude he is inviting the very thing he fears! For one of the surest ways of encouraging a *serious* sickness is to neglect a seemingly *small* one. Heart and other organic diseases, stomach ulcers, and nervous disorders—diseases to which men in the so-called "prime of life" are particularly susceptible—thrive on neglect.

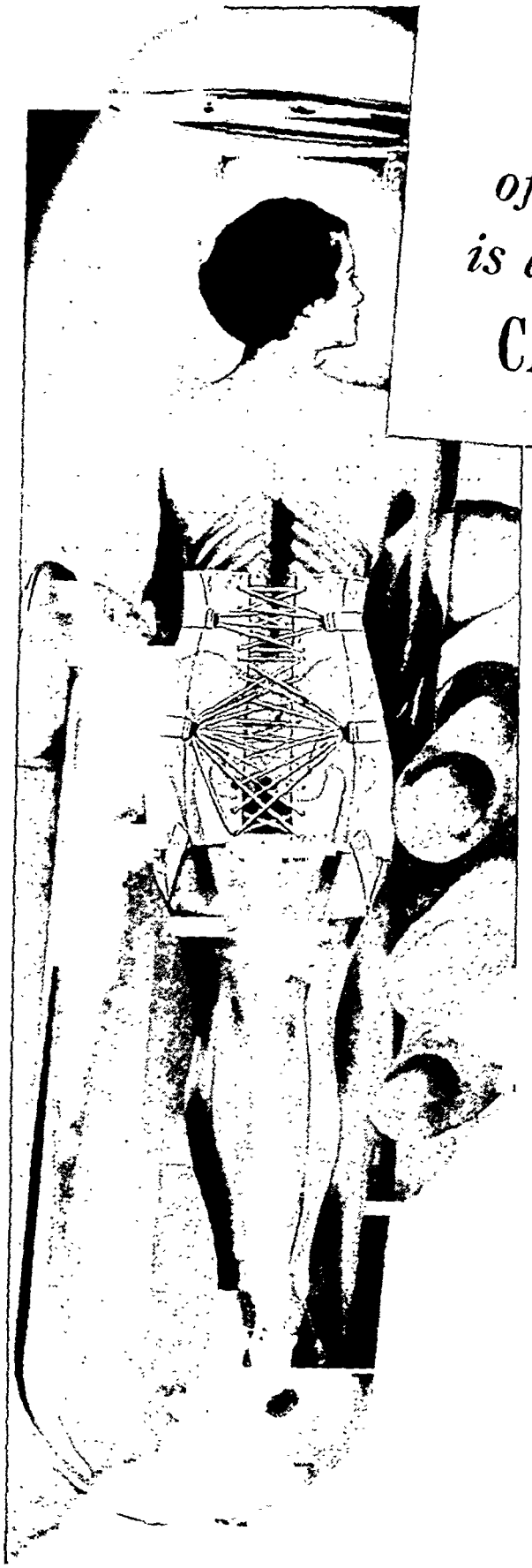
When you see your doctor he may, to be sure, prescribe a short rest. But isn't that better than a *forced long* rest later? He might say: "Take things a little easy. Leave the office an hour earlier at night." But isn't that better than driving on relentlessly until you're *carried* out of the office?

Let us hope, of course, that your disturbance will turn out to be a minor one—and that its treatment will be simple, its correction rapid. But whatever is wrong, you'll be better off if you start correcting it before it becomes really serious. The most sensible thing you can do, therefore, is to see your doctor *now*.

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—RATNER, BRET: J. Pediat., IX: 812, 1936

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And no evaporated milk satisfies all requirements of quality and uniformity more completely than Irradiated Carnation Milk. In the production of this milk the highest standards are observed, from the selection and supervision of raw-milk sources to the last step in its scientifically controlled processing.



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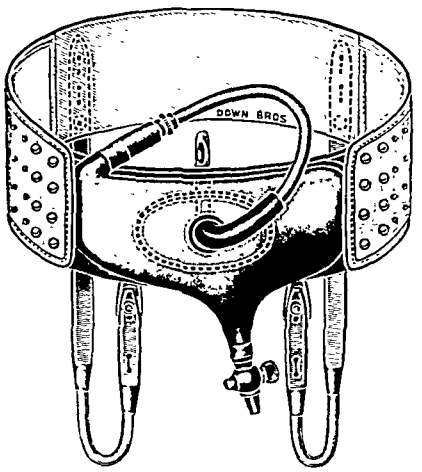
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A CANADIAN PRODUCT — *"from contented cows"*

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ATLANTIC CITY

CANNED FOODS AND THE PUBLIC HEALTH

III. Iron and Tin Salts

● The question is sometimes raised as to whether the metallic salts which canned foods may acquire from contact with tin containers are objectionable from the standpoint of public health. We are glad to present the facts in answer to this question.

The modern "sanitary style" can is manufactured from "tin plate". As the name implies, tin plate is made by plating or coating thin steel sheets with pure tin. This tin coating cannot be made absolutely continuous; under the microscope, minute areas can be noted in which the steel base is exposed.

Foods packed in plain or unenamelled cans are, therefore, exposed to iron and tin surfaces. In enamelled cans, foods are mainly in contact with inert lacquers baked onto the tin plate at high temperatures. However, because of minute abrasions in the enamel covering, unavoidably introduced during fabrication of the can, foods in enamelled cans may also have limited contacts with iron and tin surfaces.

It is common knowledge that canned foods may acquire small amounts of these metals from contact with their containers. The acquisition of iron and tin salts in this manner is an electrochemical phenomenon (1); and the amounts of these metallic salts thus acquired will depend, among other factors, upon the character of the food. In general, the acid foods tend to take up more of these metals; especially when air is admitted after the can is opened. However, the quantities of tin or iron present in canned foods, as a result of reaction with the container, are small; the analytical chemist reports these amounts in "parts per million".

As far as iron is concerned, it is commonly accepted that the amounts of this element—recognized as essential in human nutrition—which may be present in canned foods, are innocuous.

As to the tin salts which may be present in canned foods, the U.S. Department of Agriculture makes the following statement as the result of its investigation:

> "Our own experimental work, involving the ingestion of far larger amounts of tin than any previously reported, and supported by the experimental evidence of other investigators, leads us to the conclusion that tin, in the amounts ordinarily found in canned foods and in the quantity which would be ingested in the ordinary individual diet, is for all practical purposes, eliminated and is not productive of harmful effects to the consumer of canned foods." (2)

It may therefore be stated that the amounts of tin and iron salts normally present in commercially canned foods are without significance as far as possible hazard to consumer health is concerned.

AMERICAN CAN COMPANY
MONTREAL HAMILTON - TORONTO
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(1) Kohman and Sanborn, Ind. Eng. Chem. 20, 76, 1373 (1928); ibid, 22, 615 (1930).

(2) "Food-Borne Infections and Intoxications", F. W. Tanner, Twin City Pub. Co., Champaign, Ill., 1935, p. 90.

After THE MIDNIGHT CONFERENCE

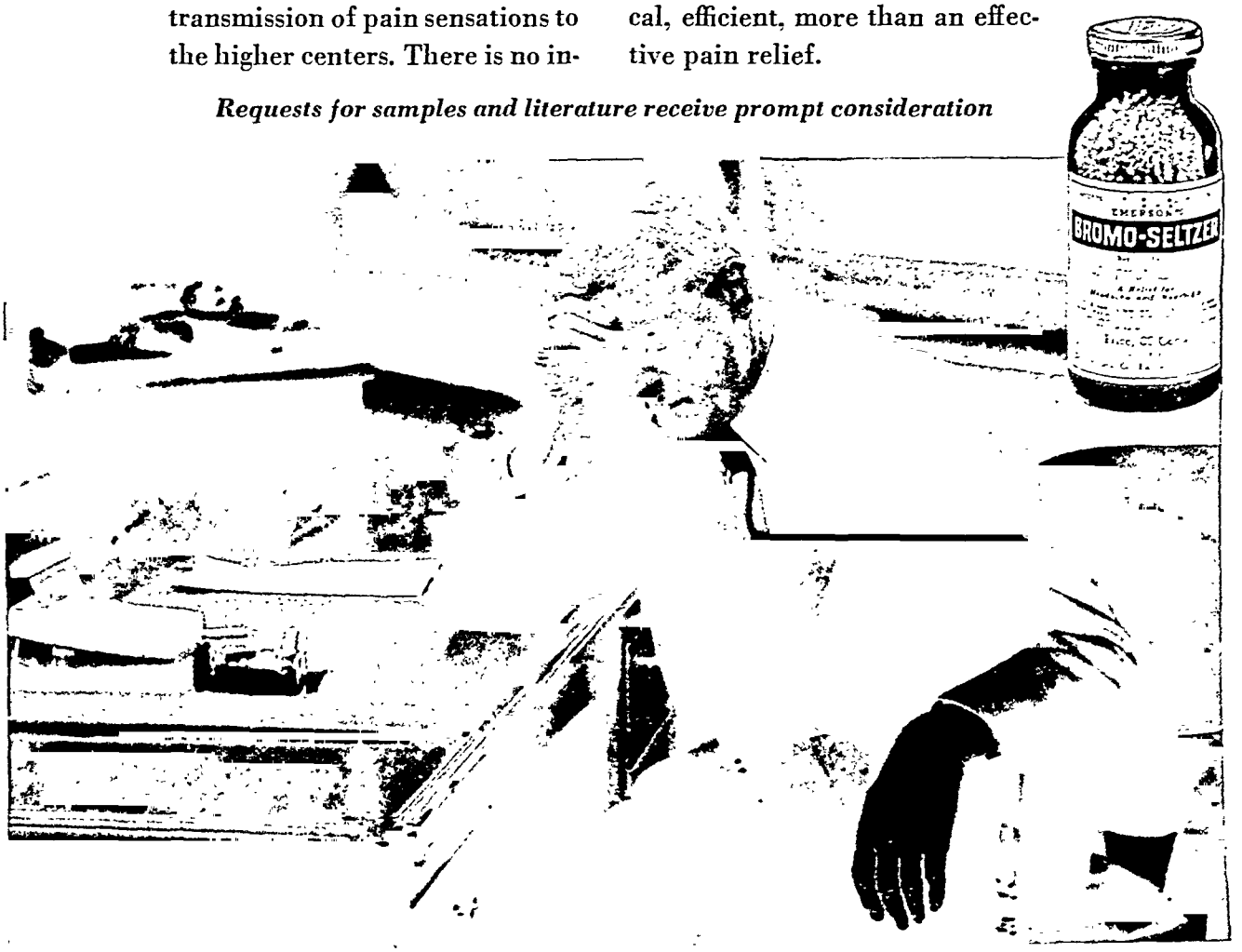
He comes to you. Sharp headache pains. Nerves "shot." Mental faculties dull. Very tired. And digestive system way below par. Yet he must return to his office at once to clear up some important business. He leaves it squarely up to you.

Your first consideration is relief of the pain. You eliminate narcotics. Consider Bromo-Seltzer, which blocks the synaptic junctions and so prevents the transmission of pain sensations to the higher centers. There is no interference with mental activity.

Bromo-Seltzer gives you prompt analgesia — plus gentle stimulation of the intellect. It soothes the irritated nerves and permits relaxation . . . Citrates in Bromo-Seltzer tend to set the digestive system right, to replenish the alkaline stores for improved well-being.

Bromo-Seltzer makes a bubbling, effervescent drink of exceptional palatability. It is economical, efficient, more than an effective pain relief.

Requests for samples and literature receive prompt consideration



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"Ciba"

Coramine is a 25% aqueous solution of pyridine-B-carboxylic acid diethylamide, available in liquid form for oral use and in sterile ampoules for parenteral administration.

By a direct influence on the centre, it acts as a most efficient **respiratory stimulant,** increasing both the depth and the rate of respiration, either under normal conditions or when the centre is depressed by drugs or disease toxins. — Coramine **stimulates the heart,** leading to an increase in the output of blood; at the same time it tends to cause vascular relaxation, so that, with or without a rise in blood-pressure, the rate and efficiency of the circulation are improved.

AMPOULES
(in cartons of 5, 20 and 100)

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(for oral administration only)



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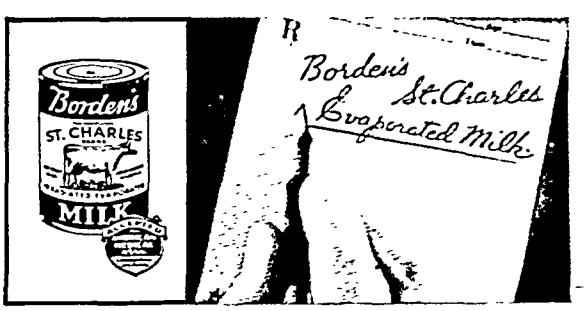


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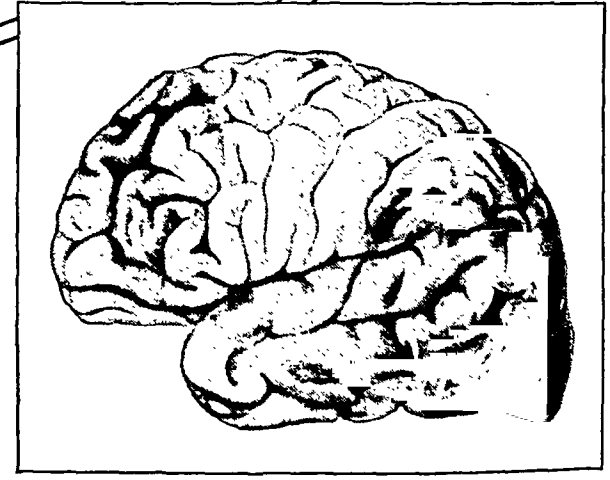
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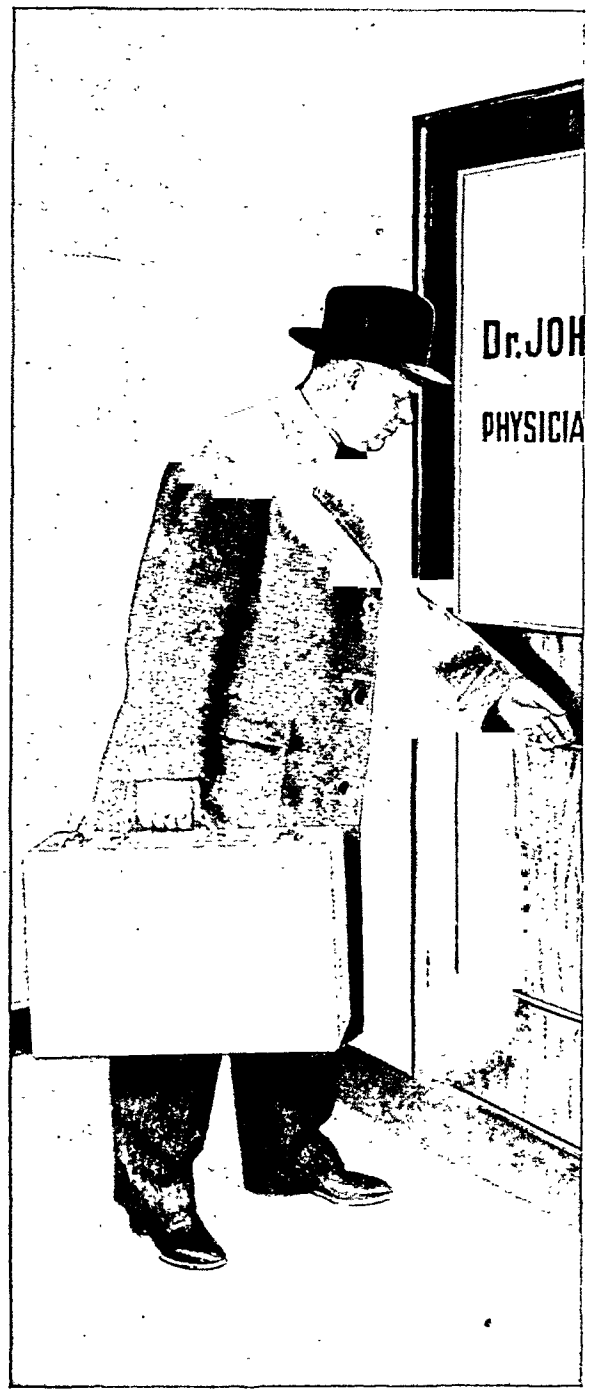
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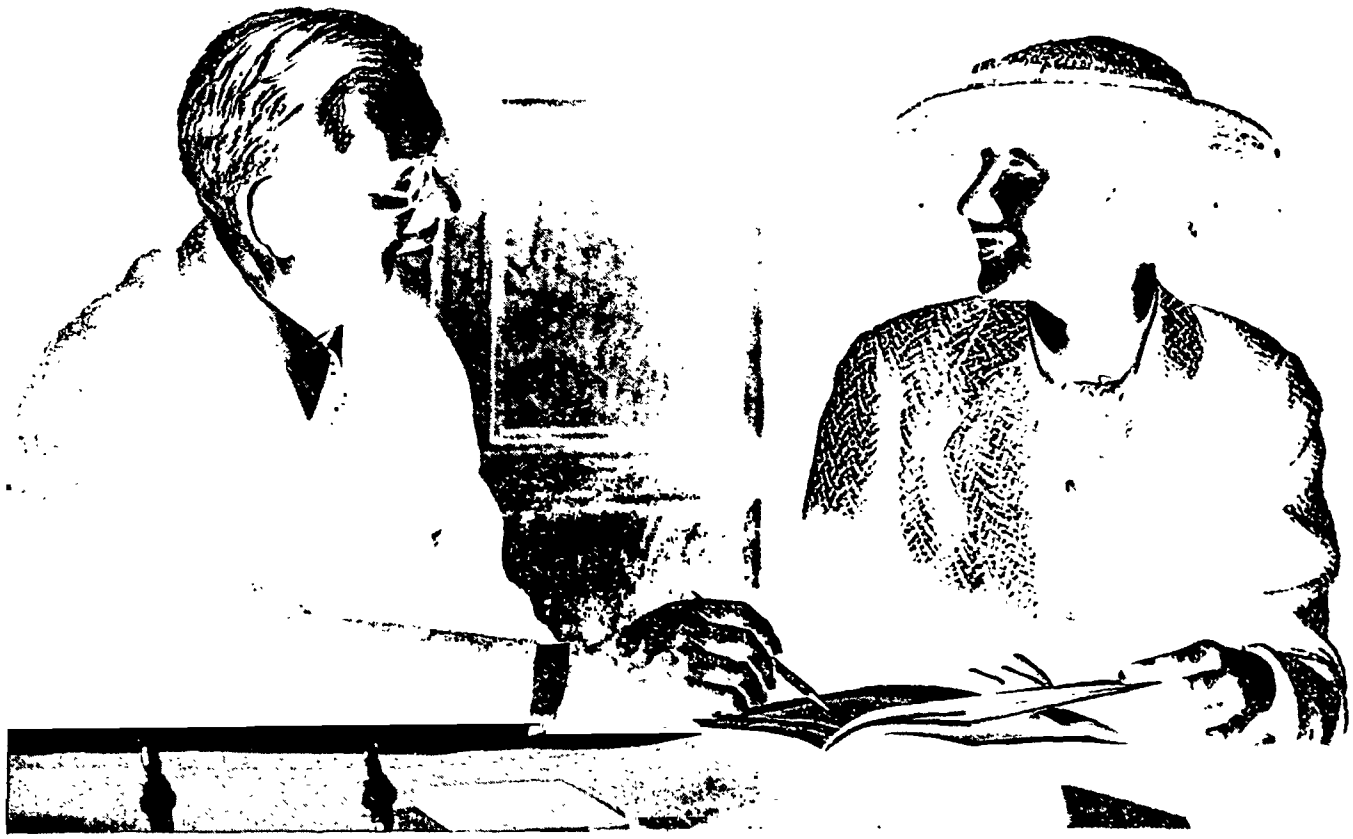
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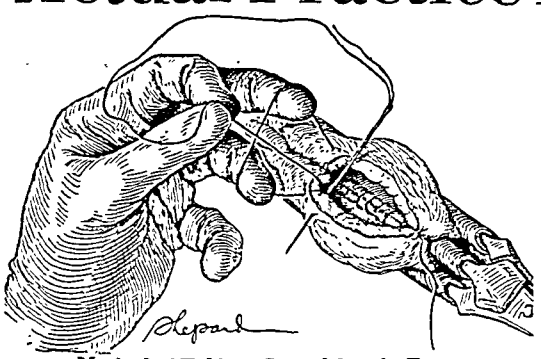
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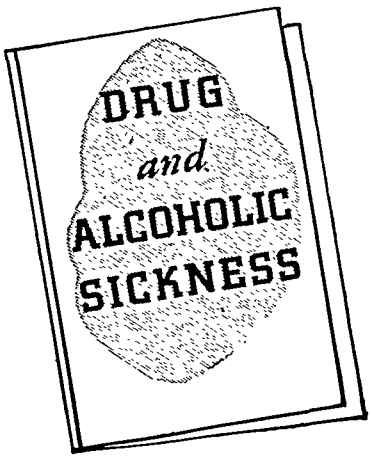
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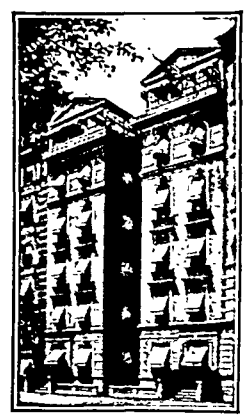
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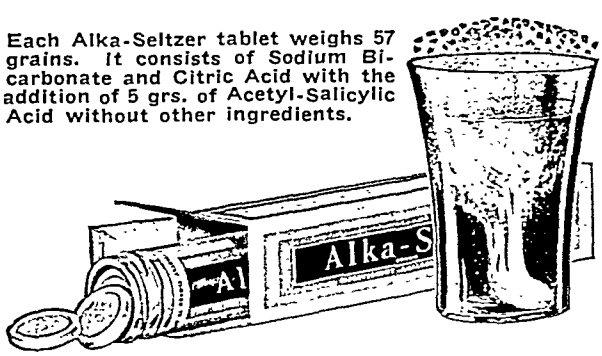
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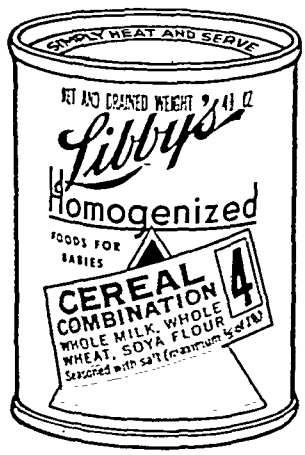
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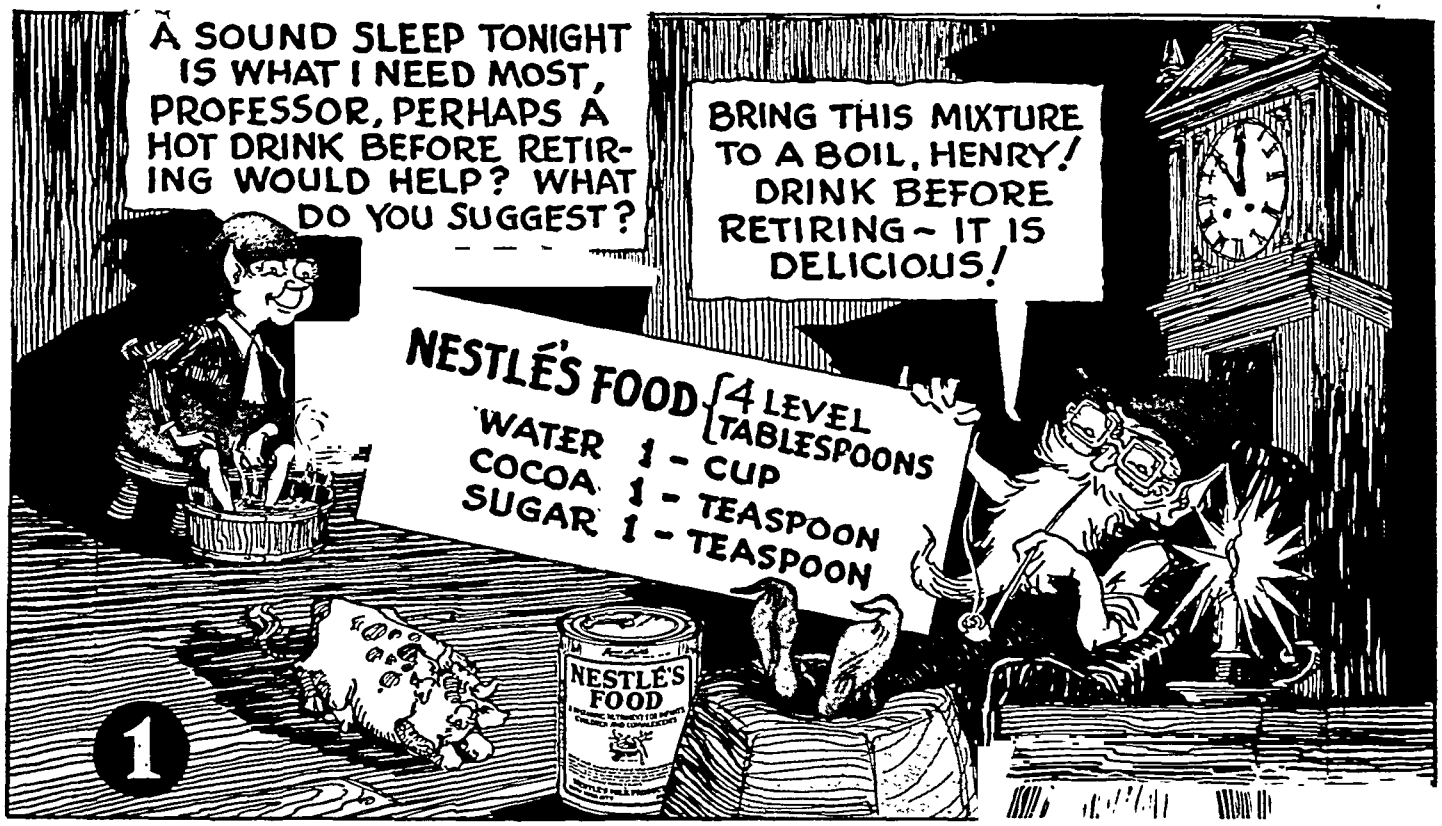
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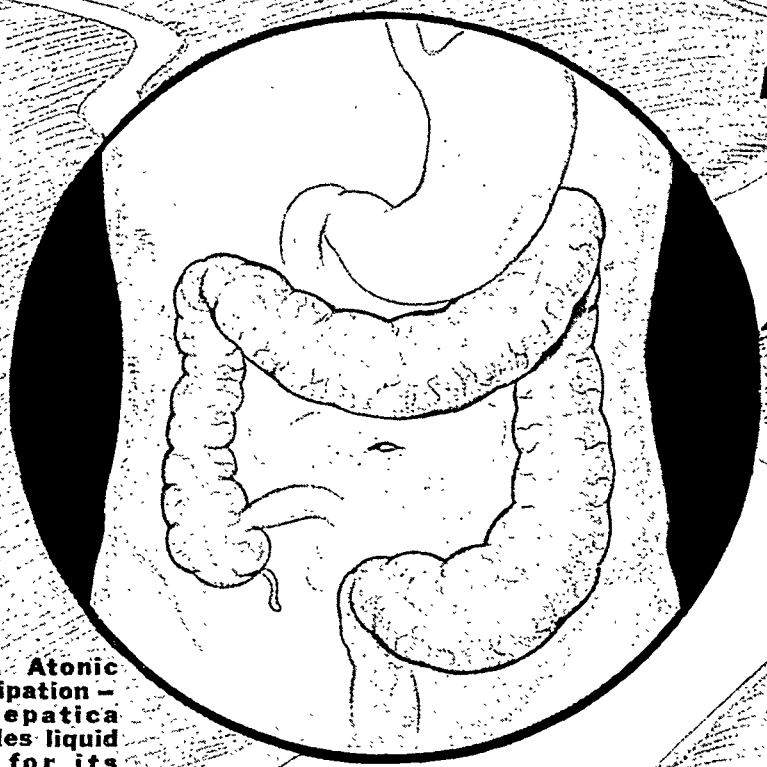
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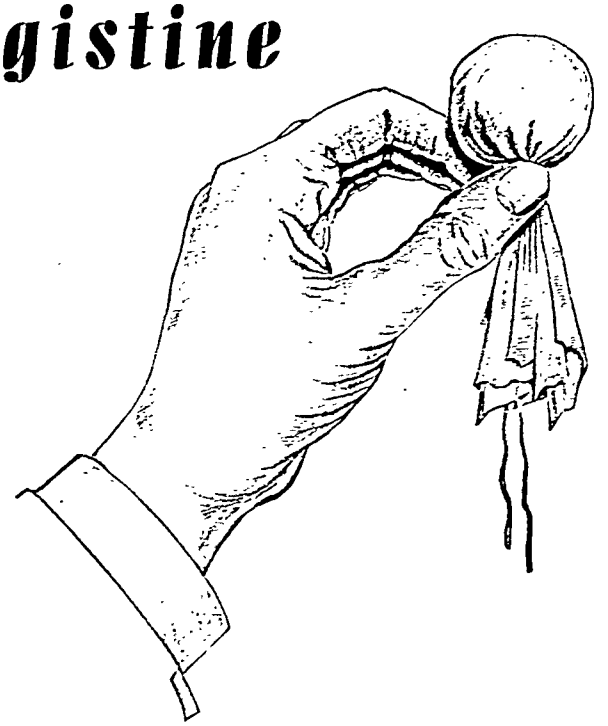
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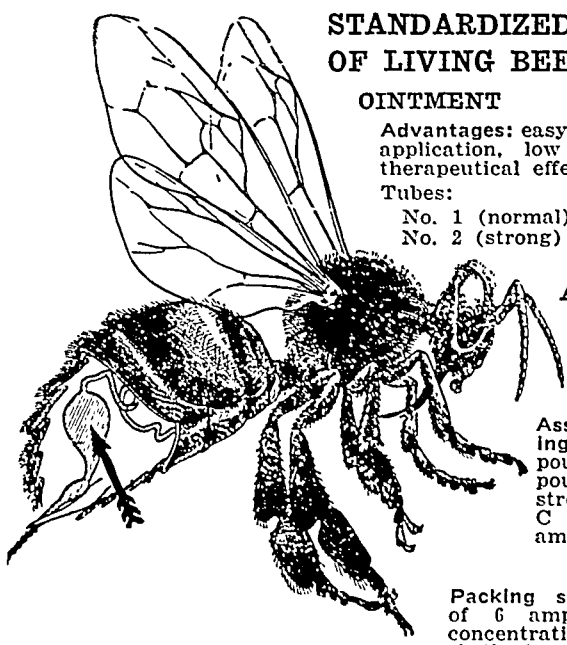
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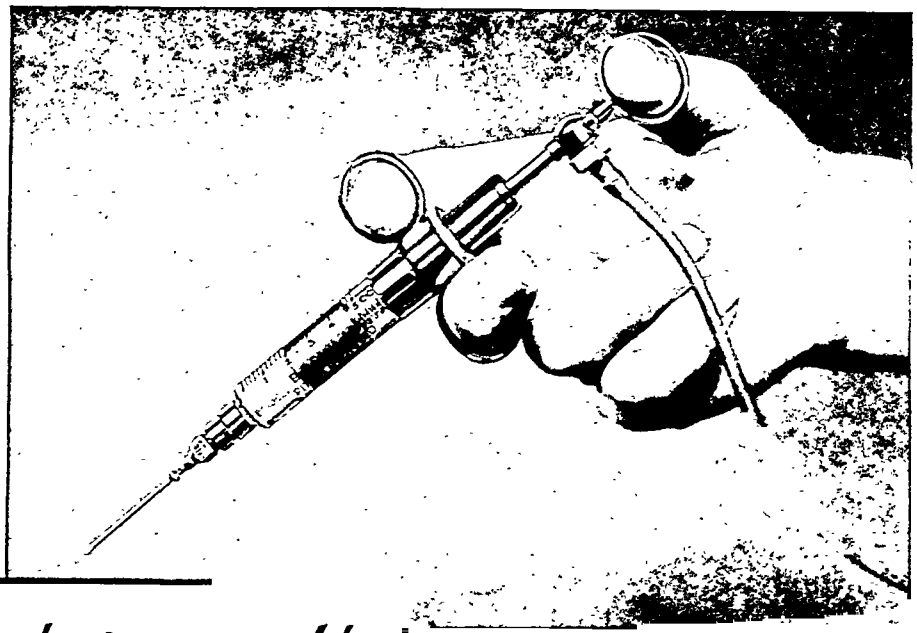
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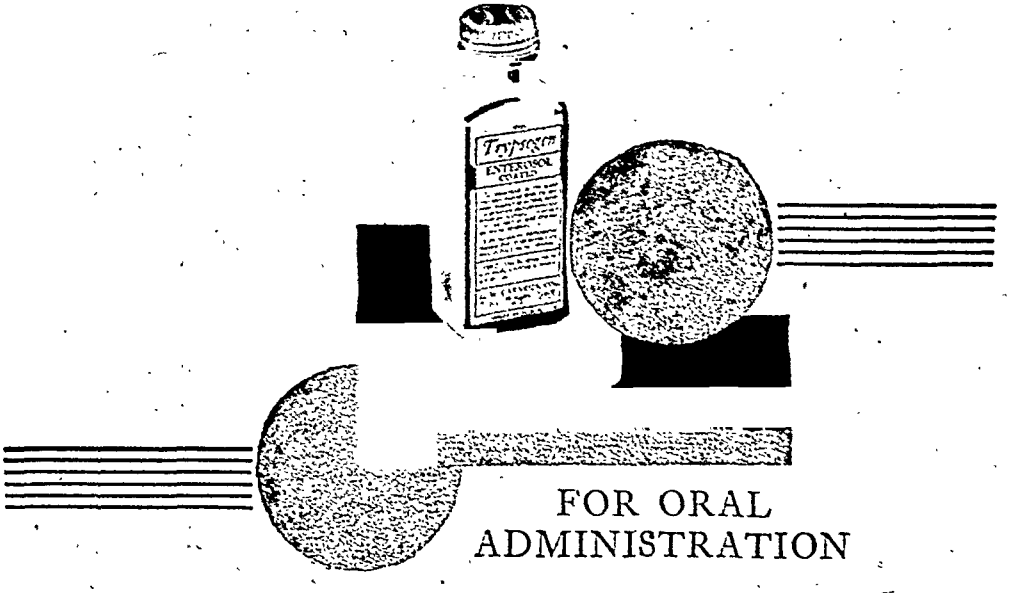
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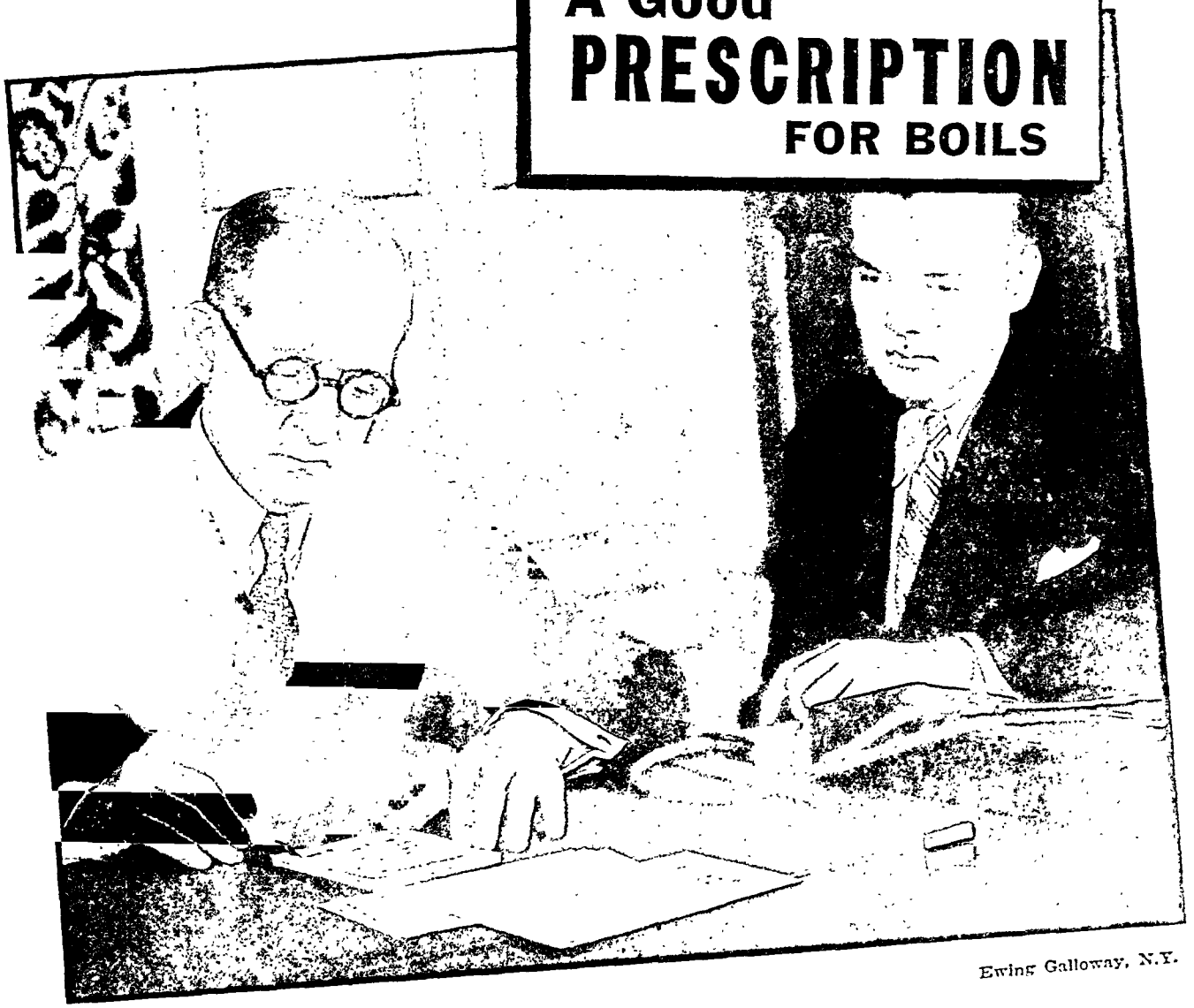
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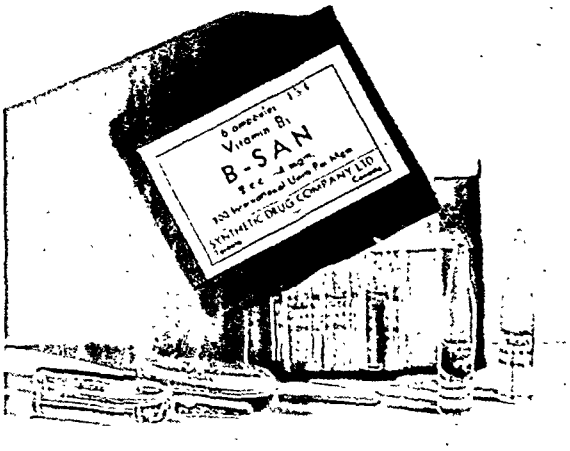
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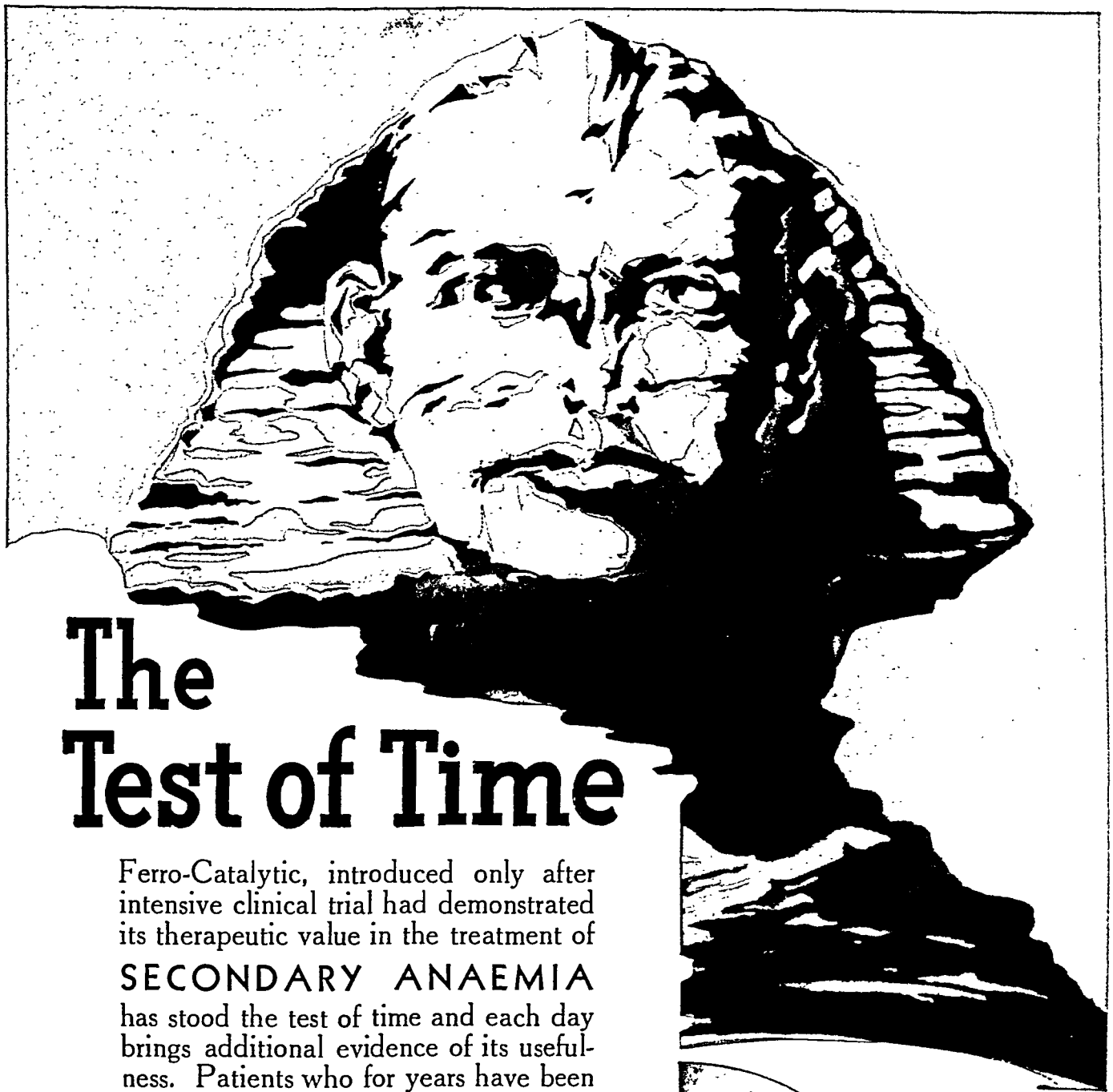
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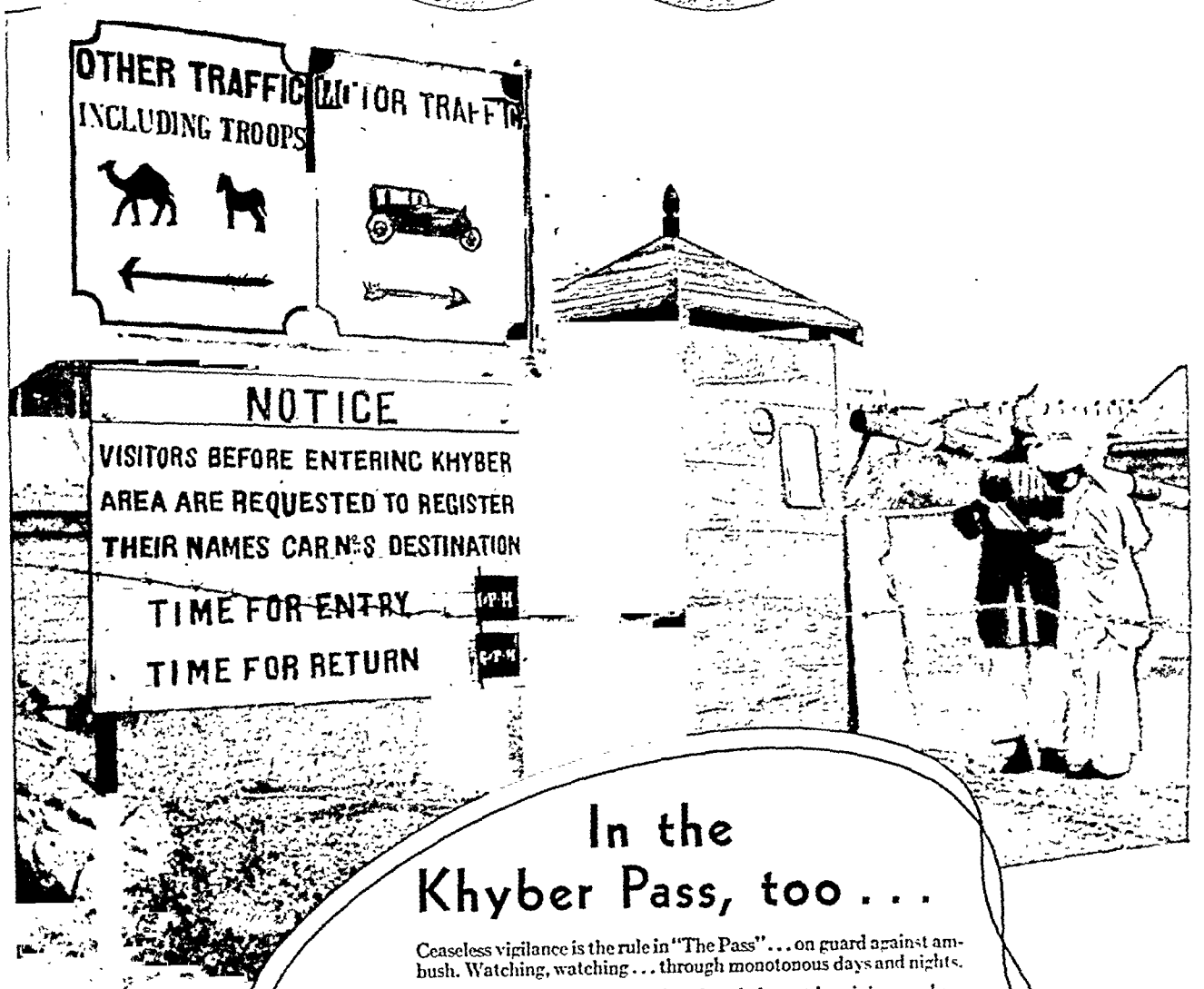
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A mutual medical defence union founded in 1901 at the Winnipeg meeting of the Canadian Medical Association, incorporated by act of Dominion Parliament, February, 1913, and affiliated with the Canadian Medical Association, 1924.

OBJECTS: To assist in the defence of its members in cases of alleged malpractice, and to encourage honourable practice in the daily work of the medical profession. The annual fee is five dollars per calendar year, half-rates after July first.

Subject to our by-laws, assistance is given by the payment of the taxable costs of actions together with reasonable counsel and witness fees in cases undertaken by our Association, as well as damages if awarded. All members in good standing of the Canadian and various Provincial Medical Associations may be enrolled upon signing the application form and paying the annual fee. All other regularly qualified practitioners must have their application countersigned by two members of our Association. Blank application forms and other literature upon request.

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Unfortunately, there are on the market large numbers of "baby" soaps, many of them imported. And mothers buy them with a confidence which is not justified by facts.

Laboratory analyses of 20 such soaps revealed that a considerable proportion contained free fatty acids or free alkali. Many were also characterized by off-white colour and unpleasant odour. They were definitely unsuitable for a baby's tender skin.

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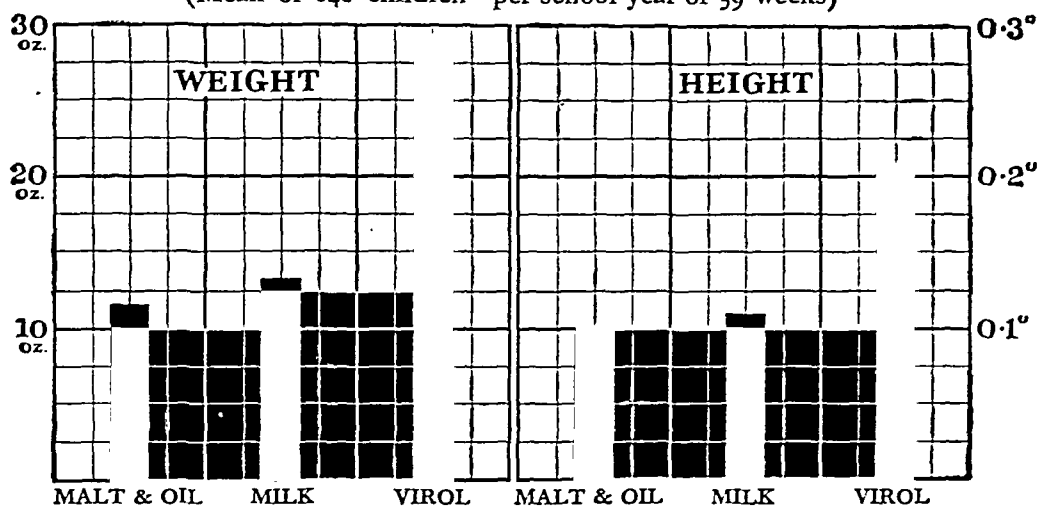
AND THEIR DISTRIBUTION

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Additional gain over "no supplement"

(Mean of 648 children—per school year of 39 weeks)



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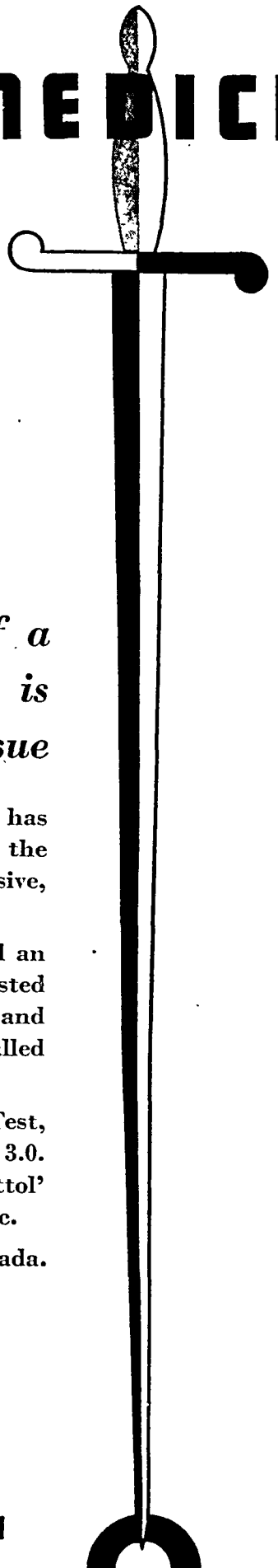
District	1	2	3	4	5	6
Normal Home Diet	1.38	1.47	1.22	1.67	1.20	0.44
Do. plus VIROL	1.93	1.78	1.94	2.73	2.02	1.47

Although the normal home diet obviously varied widely, Virol consistently added sufficient of the missing essential elements to counteract effectively the multiple deficiencies. In all children whose diet is incomplete, Virol will evoke a maximum response.

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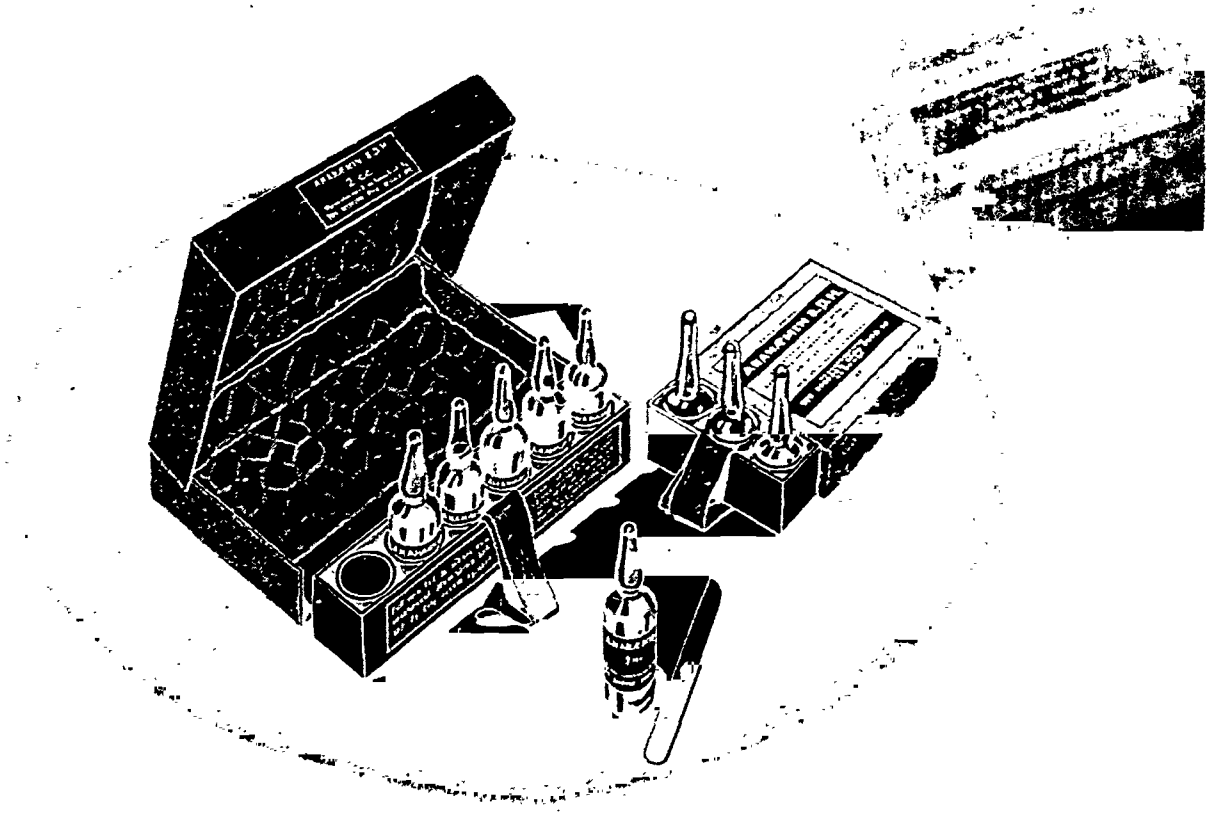
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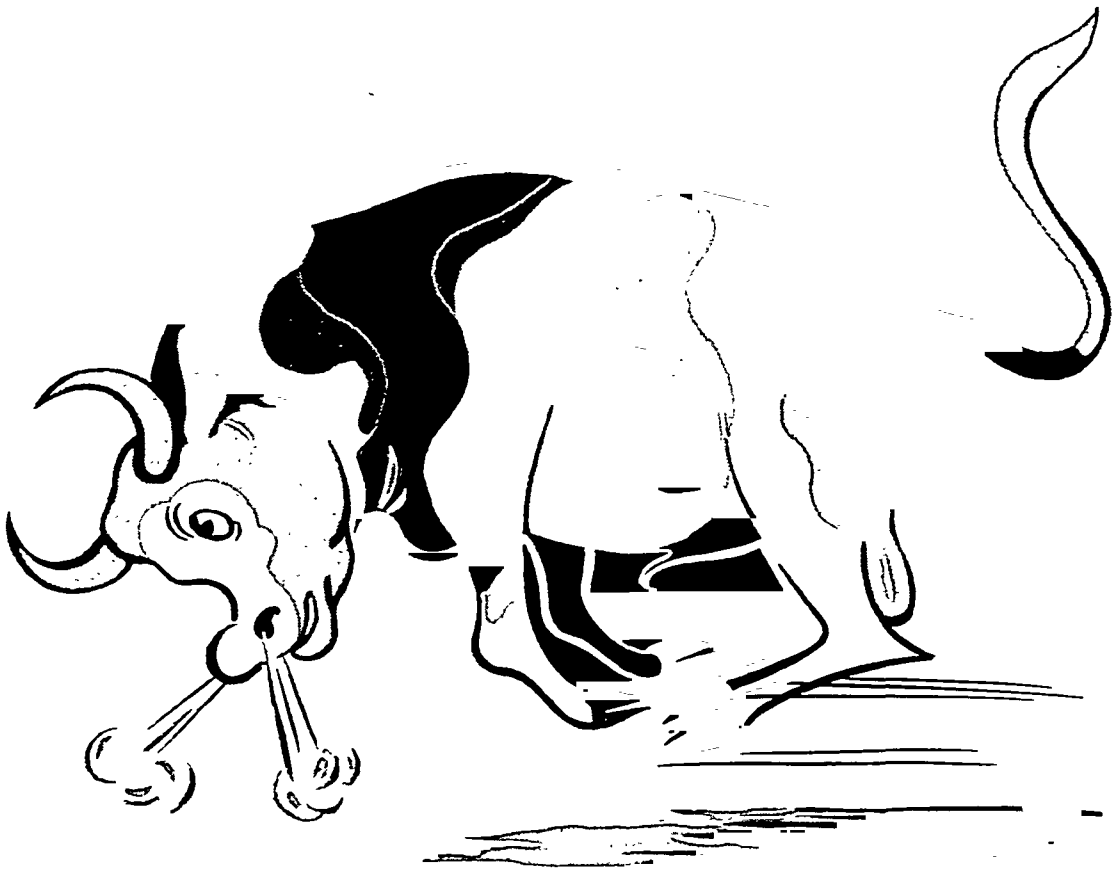

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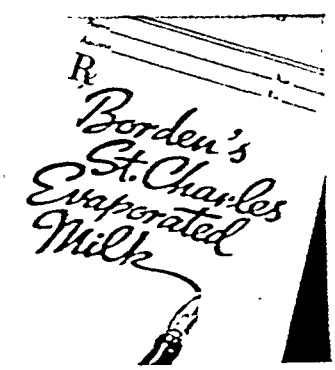
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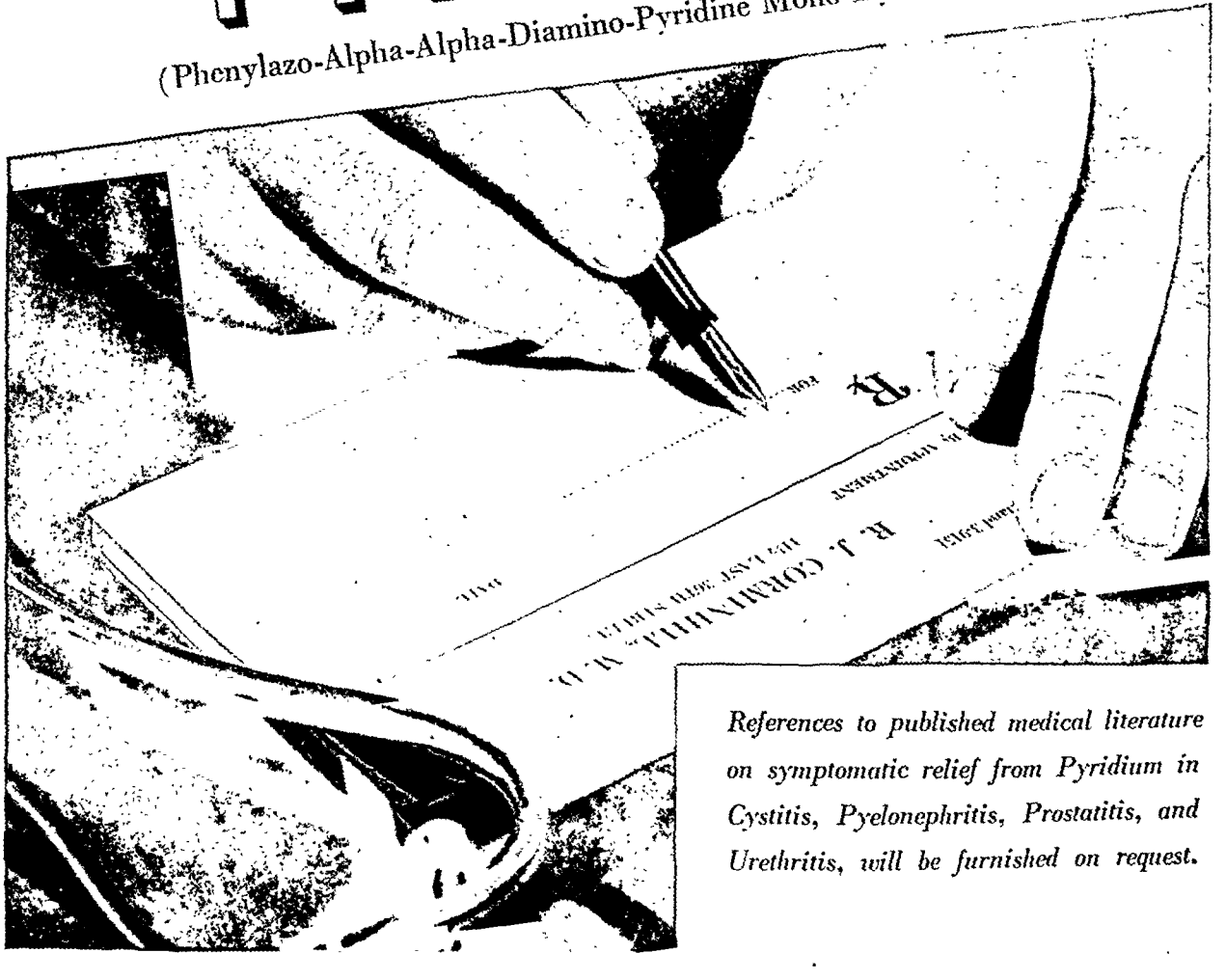
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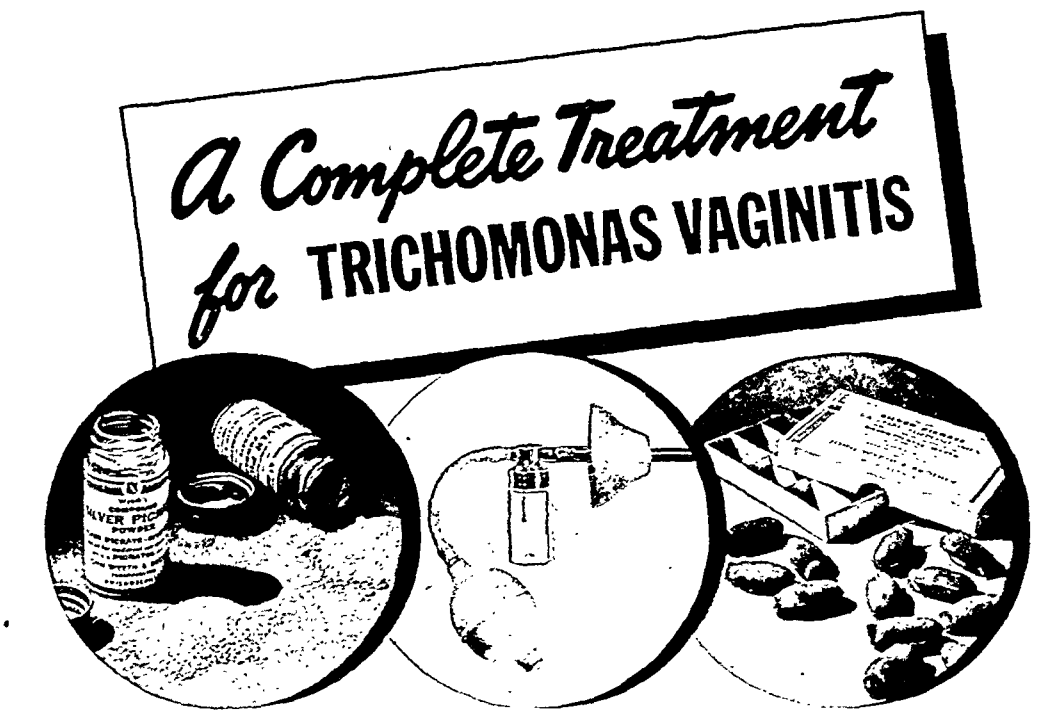
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THE ABNORMAL FUNCTIONING OF THE GASTRIC SECRETORY MECHANISM AS A POSSIBLE FACTOR IN THE PATHOGENESIS OF PEPTIC ULCER*

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THE following discussion of the nature of the gastric secretory mechanism and of its abnormal functioning as a possible cause of peptic ulcer formation is not entered upon with any idea of adding yet another to the numerous theories of ulcer pathogenesis already in existence. Its aim is more modest. During our study of the physiology of the gastro-intestinal tract my co-workers and I arrived at a new conception of the regulation of the secretory activity of the gastric glands. It became evident that under certain circumstances, owing to some defect in the secretory mechanism, gastric secretion may deviate from its normal course, and conditions may arise which initiate destructive processes in the gastric mucosa. Since many diseases are due to inborn or acquired defects in the functioning of various mechanisms of the body, an attempt to discuss some aspects of the etiology of gastric ulcer from the physiological point of view seems justifiable. A brief exposition of the facts relating to the normal gastric secretory mechanism will be used as a basis for the interpretation of the pathological phenomenon in question.

I.

Physiology divides the process of gastric secretion into three phases: (1) the nervous, sometimes called the "cephalic", phase; (2) the pyloric phase; and (3) the intestinal phase. The two latter are often termed jointly "the chemical phase". The existence of these three phases is firmly established, but their respective mechanisms are in many points still obscure. Since there are various indications that overactivity of the vagus nerves plays a predominant part in the pathogenesis of gastric ulcer (*cf.* Winkelstein[1, 2]), the present paper will deal chiefly with the first, or nervous, phase of gastric secretion. During this phase the impulses from the central nervous system are transmitted to the gastric glands along the vagi. Reflex stimulation of the vagi through the sensory nerves of the buccal cavity or through other organs, as well as artificial stimulation applied directly to these nerves by means of an induction current, elicits a copious flow of strongly acid gastric juice, rich in pepsin and "dissolved mucin". "Vagal" juice also contains a certain amount of "visible mucus", which is especially noticeable at the end of the secretory period following sham-feeding (Webster[3]) or during secretion produced by the application of a weak induction current to the vagi (Vineberg[4]). The latter type of secretion is arrested by atropine and is not affected by ergotamine (Baxter[5]). The source of the "visible mucus" is probably the surface epithelium of the fundic mucosa.

Like those of other parasympathetic nerves the effects of impulses from the vagus are transmitted to the stomach by liberated acetylcholine. This was proved in the case of the muscles of the stomach by Dale and Feldberg,[6] who showed by means of various biological tests that the concentration of acetylcholine in eserinized blood or perfusate collected from the gastric veins was markedly increased during vagal stimulation. No such proof exists as yet in regard to the secretory function of the stomach. However, the facts that the gastric glands produce a "vagal" type of secretion in response to acetylcholine (Vineberg[7]) or choline (Mac-

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Intosh and Krueger[8]) and that the gastric secretory nerves may be paralyzed by small doses of atropine, strongly suggest that the chemical transmitter of the vagal secretory impulses is acetylcholine. Therefore the vagus is to be regarded as a secretory nerve for the peptic and the parietal cells of the gastric glands as well as for the surface epithelium cells of the gastric mucosa. There are not sufficient data to show that the vagus also innervates the chief, or mucous, cells of the neck (mucoid cells).

Whereas section of both vagi, as was demonstrated long ago by Pavlov,[9] and confirmed recently by Farrell,[10] completely abolishes the effect of sham-feeding, splanchnectomy did not interfere with this reflex (Baxter[11]); however, section of both splanchnic nerves in the cat initiated a "paralytic secretion" of mucoid fluid which lasted for about two weeks. Stimulation of the splanchnic nerves with an induction current, or repeated injections of adrenaline, in the cat provoked a slow but steady secretion of alkaline mucus possessing low digestive power and a lower content of total chloride than the typical acid secretion. Atropine did not abolish the adrenalo-sympathetic mucous secretion, whereas cocaine increased and ergotamine diminished it. The greatest volume of this secretion was obtained from the smallest division of the stomach, namely, the pyloric part, the volume from the body of the stomach being somewhat less, and that from the fundus very much less (Baxter[5]). Therefore it seems logical to conclude that the splanchnic nerves innervate not the mucous cells of the surface epithelium but the chief cells of the neck and also the pyloric cells, which in many respects are similar to the latter. This theory is in agreement with the observation of Aschoff,[12] Billenkampf[13] and others, that from the cardiac region towards the pyloric antrum the number of peptic cells in the gastric tubules gradually diminishes, whereas the number of chief cells of the neck gradually increases.

Among the chemical substances that are formed in the body histamine has proved to be one of the strongest stimulants of gastric secretion. Its effect on the gastric glands is specific. As was shown in our laboratory (Babkin,[14] Vineberg and Babkin,[15] Webster,[16] Bowie and Vineberg,[17] Toby[18]) and independently of us by Gilman and Cowgill,[19] histamine when administered to dogs and cats stimulates the parietal cells almost exclusively, affecting the mucous and peptic cells hardly at all. Moreover in certain doses it inhibits the activity of the two latter types of cells (Alley[20]). With minor reservations all this holds true in respect of the human gastric glands (Toby,[21] Babkin[22]). Therefore the "histamine" gastric juice, being an almost exclusive product of the parietal cells, possesses a very high acidity, contains a maximum amount of total chloride (only a very small part of which is in the form of neutral chloride), and is extremely poor in pepsin and dissolved mucin as well as in visible mucus.

Could it be that histamine, which provokes a flow of gastric juice of such special composition, forms part of the normal mechanism of gastric secretion? From certain indications it would appear that histamine in the capacity of a stimulant participates in the process of normal gastric secretion. First, there is the fact of the special composition of the gastric juice secreted during the chemical pyloric phase, which is no less acid than the juice of the nervous phase, but possesses a markedly weaker peptic power than the latter. It would greatly simplify the whole problem of the regulation of gastric secretion during its pyloric phase if it could be proved that histamine is indeed the hormone of this phase. However, there are many facts which argue against this theory. Thus Sacks, Ivy, Burgess and Vandolah[23] and Schnedorf and Ivy,[24] who were able to extract from the pyloric mucosa only one gastric secretory stimulant, namely, histamine, are still not absolutely sure that histamine is the hormone of the pyloric phase. Koskovski's[25] statement that the histamine equivalent of the systemic blood is increased after a meal was not confirmed in our laboratory by MacIntosh,[26] who employed more reliable methods of histamine determination than his predecessor. Recently Komarov[27] was able to extract from canine pyloric mucosa a substance which was neither histamine nor choline, and which on intravenous injection stimulated a flow of gastric juice that was highly acid but low in pepsin. Furthermore, during the chemical phase the peptic power of the normal gastric juice is much higher than that of the "histamine" gastric juice. Some of these considerations caused me (Babkin[28]) a few years ago to become doubtful as to whether histamine is the hormone of the pyloric phase of gastric secre-

tion. Nevertheless, there are strong indications that histamine participates in the normal gastric secretory mechanism. In experiments in which the respective compositions of "sham-feeding" and "histamine" juice were compared (Toby[16]), it was shown that, apart from the rate of secretion, the "sham-feeding" juice seems to differ fundamentally from the "histamine" juice only in respect of the concentrations of total organic substances and pepsin, which were incomparably greater in the former secretion than in the latter. The most striking fact observed in these experiments was that the total chloride concentrations were equal in both types of juice. It is very probable that the chloride concentration of the secretion of all the cellular groups of the gastric tubules, with the sole exception of that of the parietal cells, is equal to that of the blood — a theory advocated particularly by Hollander;[29] the parietal cells alone are able to concentrate chloride to a level far exceeding the level of chloride in the blood. If this theory is accepted, and there is no reason why it should not be, the only conclusion to be drawn from Miss Toby's experiments is that almost all the water of the gastric juice is secreted by the parietal cells. This explanation is strongly supported by clinical observations on cases of achylia gastrica, in which the volume of the secretion is meagre, the chloride concentration low, and the acidity nil, although the juice still possesses definite peptic power.

All these considerations lead to the hypothesis that the parietal cells, whether under subcutaneous administration of histamine or under vagus action, are stimulated in either case by histamine. Our efforts have been directed towards the solution of this problem, and we may say with satisfaction that this hypothesis is quickly attaining the status of a theory substantiated by a number of facts.

The first indication that histamine, which is so abundantly deposited in the stomach and in the gastric mucosa (Best and McHenry,[30] Gavin, McHenry and Wilson[31]), may participate in the mechanism of gastric secretion came to us through the finding of a histamine-like substance in the gastric juice. In investigating the physiological and chemical properties of the nitrogenous bases precipitable by phosphotungstic acid from canine gastric juice, Komarov[32] found that the histidin-arginin fraction exerted a secretagogue effect on the gastric glands. In a further study Komarov[33] isolated the arginin fraction from the nitrogenous bases of the gastric juice; this fraction exhibited a histamine-like action on the blood pressure and on the secretion of pancreatic juice. 0.25 mg. of histamine was approximately equivalent to the arginin fraction of one litre of gastric juice. Independently of us, Brown and Smith,[34] using Best and McHenry's[30] method, extracted from human "fasting" and "histamine" gastric secretions a substance which lowered the blood pressure and contracted the virgin guinea-pig uterus. They found that it was present in relatively high concentration in the juice, but unfortunately it could not be isolated chemically from the juice. Kitsugawa,[35] on applying Kossel and Kutscher's method of fractionation to the human gastric juice, isolated the lysin, arginin and histidin fractions from it, the last two in especially large amount. Offelein[36] determined the presence of imidazol bodies in human gastric juice, among them presumably histidin and histamine. No attempt was made by him to determine them separately. He found in normal persons that the curves representing gastric acidity and the concentration of imidazol derivatives in the gastric juice run parallel. In some pathological conditions of the stomach (delayed evacuation, cancer, gastric ulcer) these relations were distorted. Histidin or histamine administered either intramuscularly or subcutaneously resulted in an increased concentration of the imidazol bodies in the gastric juice.

The high concentration of the "histamine-like" substance in the gastric juice and the lack of proof that it is histamine, prompted us to reinvestigate the whole problem, employing the best known biological methods of histamine determination. In somewhat modified form the method used by Barsoum and Gaddum[37] (see also Gaddum[38]) for the determination of histamine in the blood by tests on the guinea-pig ileum was adopted in our laboratory by Dr. F. C. MacIntosh for the determination of the histamine equivalent of the gastric juice. All the samples of juice obtained by sham-feeding or by subcutaneous administration of histamine in dogs with œsophagotomy and a gastric fistula, as well as under vagal stimulation or histamine administration in anæsthetized dogs, contained a considerable amount of a substance which acted like histamine on the guinea-pig ileum. That the substance extracted from the gastric

juice was histamine itself is shown by the following facts. It could be destroyed by ashing, but not by boiling with HCl or even by boiling for two hours in the presence of N/1 NaOH. It failed to act in "over-dosage" tests in which the guinea-pig intestine had been treated with an excess of histamine. Atropine did not abolish its effect. The sensitivity of the freshly excised strip of intestine to the extract developed gradually like the sensitivity to histamine. When neutralized and concentrated at a low temperature the gastric juice possessed a histamine-like activity which corresponded to that of the extracts. Therefore it is highly probable that the active principle of the extracts was present in a free state in the gastric juice.

In MacIntosh's studies the concentration of histamine in different types of gastric juice varied from 4 γ to 22 γ per litre of juice. As the rate of secretion increased or diminished, the histamine equivalent correspondingly rose or fell. Thus, for example, in a sham-feeding experiment on one dog ("N") the rate of secretion increased from 1.3 c.c. to 3.0 c.c. per minute and the histamine equivalent rose from 9 γ to 15 γ per litre (calculated as histamine base). In another dog ("U") the "sham-feeding" secretion fell from 2.2 c.c. to 1.6 c.c. per minute and the histamine equivalent diminished from 15 γ to 10 γ per litre. The histamine equivalent of the gastric juice secreted in response to histamine administration was of the same value as that of the "sham-feeding" or the "vagal" juice. There are, however, no data which throw any light on the mechanism whereby the vagus nerve, or to be more exact, acetylcholine, enables histamine to act on the parietal cells.

As to the possible source of the histamine present in the gastric juice, it may be supposed either (1) that it is derived from the circulating blood, or (2) that it is liberated from the gastric mucosa itself. Although the values for the blood histamine are close to those for the histamine of the gastric juice (5 γ to 25 γ per litre) and histamine is quickly removed from the circulation by some organs, *e.g.*, by the lungs (Tarras-Whalberg,[39] Binet and Marquis[40]), it does not seem probable that histamine contained in the gastric juice has filtered through the secretory cells from the blood. There are several facts which are in disagreement with this theory but favour the supposition that the histamine of the gastric juice is of mucosal origin. The concentration of the histamine equivalent of the venous blood obtained directly from a gastric vein during active secretion under vagal stimulation was neither diminished nor increased, but was equal to that of the histamine equivalent of the arterial blood (MacIntosh[26]). Further, as the rate of gastric secretion changed, the concentration of the histamine equivalent of the juice varied with the intensity of the secretory process (MacIntosh[26]). Again, the histamine equivalent was much more highly concentrated in the gastric juice than in the blood plasma, from which it could pass into the gastric secretion, because, as mentioned above, the total concentration of histamine in the blood passing through the stomach did not change. As already known, only a very small part of the blood histamine is found in the plasma, most of it being contained in the formed elements of the blood (Barsoum and Smirk[41]), namely in the white blood corpuscles and platelets (Code[42]). When we also consider that large doses of histamine administered intravenously do not stimulate gastric secretion, and that the stomach walls are very rich in histamine but do not contain histaminase (Best and McHenry[30]) we are inclined to believe that the source of the histamine equivalent of the gastric juice is the mucosa itself. Whatever may be the mechanism that controls the secretion of hydrochloric acid, it seems that it is necessary for histamine to pass through the parietal cells in order to excite them to activity; the fact that only a very small amount of the histamine equivalent is present in the gastric juice is apparently no objection, for it is sufficient to stimulate these cells. It is to be remembered that 0.5 mg. of histamine dichloride, *i.e.*, 0.3 mg. of histamine base, administered subcutaneously to a dog of 10 to 15 kg., or even to a man of about 60 to 65 kg., elicits a fairly copious secretion of gastric juice. After subcutaneous injection, histamine is present in the blood in such a diluted state that, following the administration of 1 mg. of histamine dichloride in a dog of 9 kg., MacIntosh[26] observed only a very doubtful rise in the histamine equivalent of the gastric juice, although there was a definite secretory response. However, when the same dog received subcutaneously 2 mg. of histamine dichloride the histamine equivalent of the blood rose in half an hour from 18 γ to 40 γ (histamine base).

In certain extracts of gastric juice which exerted a depressor effect (Komarov,[33] Brown and Smith[34]) there may possibly have been present, besides histamine, some other substances having secretagogue effects on the gastric glands.

Fig. 1 shows diagrammatically the innervation of the gastric glands in mammalian animals.

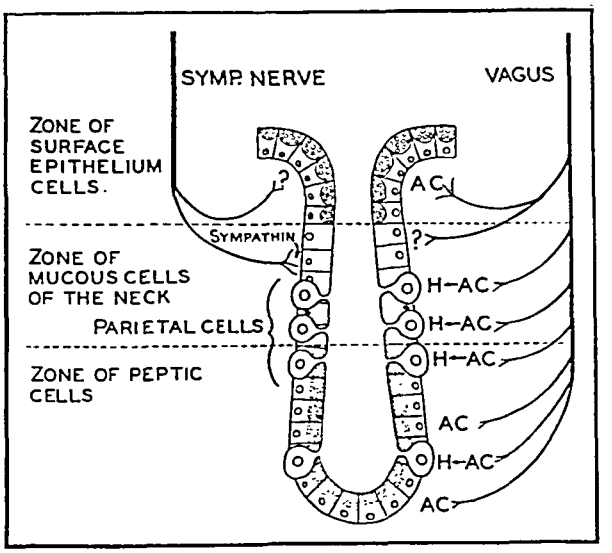


Fig. 1.—Diagram of the innervation of the gastric glands. AC = acetylcholine liberated at the endings of the vagus nerve. It acts directly on the peptic and mucous cells or, through the mediation of histamine (H—AC), on the parietal cells. Sympathin is liberated at the endings of the sympathetic nerve.

To recapitulate, it may be said that histamine or histamine-like substances pass through the secretory cells of the gastric glands and appear in appreciable amounts in the gastric juice. Since histamine is the strongest of all stimulants of the parietal cells, and since the concentrations of the histamine equivalent in the "vagal" and the "histamine" juice are of the same value, it is highly probable that histamine is conveyed into the gastric juice in conjunction with the secretion of the acid-producing cells. In view of all the data cited above it seems justifiable to conclude that the action of the vagus on the gastric glands causes liberation of histamine or histamine-like substances which stimulate the parietal cells.

II.

We now pass to the problem of peptic ulcer. The aim of the present paper is to show that in the normal gastric secretory process during which histamine is liberated there are inherent possibilities of pathological disturbances, which may eventually lead to such grave damage of the gastric or the duodenal wall as, for example, peptic ulcer. That is not to say that other factors may not also play a part in the genesis of peptic ulcer, and it is possible that excessive liberation of histamine within the gastric mucosa might be a natural consequence of some of these pathological conditions. Among the three chief causes believed to be responsible for the formation of peptic ulcer — namely, the effect of trauma and acid, local circulatory disturbances resulting from one kind of nervous hyperactivity or another, and gastritis—it seems that the second cause especially may involve overproduction of histamine or histamine-like substances in the gastric and duodenal mucosa. (For literature and critical discussion of the theories of peptic ulcer formation, see von Bergmann,[43] von Bergmann and Katsch,[44] and Alvarez[45]).

It was shown in the first part of this article that histamine may be regarded as part of the gastric secretory mechanism. However, the ability of histamine to stimulate the parietal cells is only a special and limited part of its activity. One of the most important functions of histamine in the body is its action on the blood vessels, especially on the capillaries. Histamine paralyses the capillaries and greatly increases their permeability; they are thus rendered permeable to the whole plasma, which passes out through their walls, so that they become densely packed with formed elements. The blood vessels of the gastro-intestinal tract are no exception to this rule. Stasis in the small blood vessels and infiltration of blood into the submucous and mucous membranes of the intestine and stomach have been observed by many investigators (*cf.* Feldberg and Schilf[46]). The arterioles of some organs are constricted by histamine in certain animals (*e.g.*, in the cat), but dilated by it in others (*e.g.*, in the dog and monkey (arterioles of the skin) and in man (arterioles of the brain). The larger arteries are presumably constricted by histamine. The possibility that the venules and veins are constricted by histamine is not excluded, although it is not the primary factor which determines the above-mentioned circulatory disturbances (*cf.* Best and McHenry[47]). Therefore the action of histamine may result in what the pathologists call "stasis". Stasis is a complicated phenomenon, and its causes are probably multiple. The typical manifestations are not only the cessation of the blood flow in

the capillaries, small arteries and small veins, but agglutination of the red blood corpuscles into large lumps or massive columns, and exudation of the plasma into the surrounding tissue (Krogh,[48] Tannenberg and Fischer-Wasels[49]). Thus stasis has to be distinguished from *Standstill* of the blood, during which the blood remains unchanged in composition. Tannenberg and Fischer-Wasels[49] are inclined to regard stasis as a problem of colloidal chemistry. They consider that the formation of pathological products of metabolism resulting from tissue damage has a very important part in its production. It is highly probable that histamine is one of these products of abnormal or greatly intensified metabolism.

A very accurate description, based on actual observation, is given by Ricker[50*] of local circulatory disturbances resulting from irritation of the tissue, which correspond to the vascular phenomena provoked by histamine. In the reaction of the blood vessels to an irritant stimulus, Ricker distinguishes a "pre-stasis" stage from the stage of "stasis" itself. In the stage of "pre-stasis" there is a brief acceleration of the blood flow, but it soon slows down and ceases altogether. According to Ricker the latter effect (as observed in the rabbit) is due to the constriction of the arterioles and the smallest veins. Under these circumstances the plasma may exude into the surrounding tissue or into the veins, leaving the formed elements behind. In this way a "red" stasis (*"rote Stase"*) is produced. It occurs when the slowing of the blood flow proceeds gradually. If the circulation is arrested quickly, the capillaries still retain the plasma, a condition which Ricker calls *"Stillstand"*. In the stage of stasis the diapedesis of the red blood corpuscles from the capillaries takes place.

When histamine produces a prolonged stasis in the gastric mucous membrane, the part that is deprived of its blood supply becomes devitalized and undergoes necrosis. If the resulting defect in the gastric or intestinal wall affects the mucous membrane only, there is produced what the pathologists term an "erosion" (Aschoff,[52] Hauser[53]). If an excessive amount of histamine in the tissue is able through stasis to produce an infarct in the mucous membrane it must be able to produce an erosion. It has indeed been observed by many investigators (for literature, see Best and McHenry[47] and Selye[54]) that large doses of histamine produce erosions of the gastric mucosa, or delay the healing of artificially produced ulcers (*cf.* Flood and Howes[55]). In our laboratory we have frequently observed the formation of multiple erosions and petechiæ in the gastric mucosa after the administration of massive doses of histamine or after strong and prolonged stimulation of the vagi with an induction current. Such drastic experimental procedures far exceed anything that can happen even under the most unfavourable pathological conditions. However, if, as we believe, histamine is liberated during the process of normal gastric secretion, it might be expected that not only excessively strong but even moderate continuous vagal impulses would liberate unnecessarily large amounts of this substance. This excess of histamine might produce local circulatory disturbances which eventually might lead to the formation of erosions.

It is a long way, however, from a mucosal erosion to a peptic ulcer. Erosions may appear in different regions of the gastric mucous membrane; very often they are of hæmorrhagic type. They may arise from various causes (Aschoff,[52] von Bergmann,[43] Mann[56]). A characteristic of such erosions seems to be their ability to heal quickly. Notwithstanding the frequent occurrence of erosions, comparatively few people develop peptic ulcers, and only definite regions of the gastric mucosa are affected. According to Aschoff[57] these regions are five in number: the cardiac zone, the *Magenstrasse*, the intermediary zone, the pyloric zone, and the zone of Brunner's glands. There are several reasons why peptic ulcers develop more readily in these parts of the gastric mucous membrane. Among the more important causes which determine the localization of these ulcers may be mentioned: (1) the thinness of the gastric mucosa in the above-mentioned regions of the stomach (Billenkampf[13]); (2) the less abundant blood supply to these parts than to the rest of the gastric mucosa, the blood being conveyed through "end-arteries" with a few anastomoses

* The explanation which Ricker (*cf.* also Reinhardt and Ricker[51]) gives of the mechanism of the origin of stasis is purely hypothetical, and is based on the assumption that non-destructive irritant stimuli always act through the vascular nervous system; the pathological changes in the tissue appear as a result of the vascular disturbances. This conception of Ricker is rightly criticized by Tannenberg and Fischer-Wasels.[49]

between them (Hofmann and Nather,[58] Djorup[59]); (3) the more abundant nerve supply (Shabadasch[60]) and greater nervous control of the motor and secretory functions in the regions adjacent to the lesser curvature (Alley,[61] Davidov[62]); (4) perhaps also greater exposure to the influence of mechanical and chemical irritation by the gastric chyme than in other parts of the gastric mucosa (Aschoff[57]). This last factor is, however, denied by several investigators (Katsch and von Friedrich,[63] Beer,[64] Alvarez;[45] see also Hauser,[53] p. 697 ff.). These and other factors would favour the conversion of local circulatory disturbances in the region of the lesser curvature, the pylorus or the initial part of the duodenum into a major lesion of the gastro-intestinal wall. It is probable too that excessive liberation of histamine in the mucosa of the above-mentioned regions is not the least of the causes of these disturbances.

Necheles and his co-workers (Necheles, Frank, Kaye and Rosemann;[65] Necheles, Levitsky, Kohn, Maskin and Frank;[66] and Necheles[67]) have advanced the theory that acetylcholine liberated in the stomach during the activity of that organ may produce vasoconstriction and hence may be responsible for the formation of gastric ulcers. The doses of acetylcholine which produce constriction of the blood-vessels in the stomach of the dog or the rat, are supposed to correspond to those which Dale and Feldberg[68] obtained in the blood through brief (1½ to 2 minutes') but strong stimulation of the vagi in a dog, namely, 2 γ to 5 γ per cent. Larger doses in the experiments of Necheles *et al.* produced vasodilatation. Dale and Feldberg observed a marked output of acetylcholine from the stomach under vagal stimulation only when the action of the vagi threw the muscular wall into vigorous contraction. To obtain a secretory effect a very long continued stimulation of the vagi (of 20 to 30 minutes' duration) is required. Therefore in the experiments of Dale and Feldberg acetylcholine was derived from the muscles but not from the mucous membrane of the stomach. The tempting theory of the genesis of gastric ulcer formulated by Necheles *et al.* undoubtedly deserves consideration. But how is one to reconcile the pathological overactivity of the vagus which leads to ulcer formation with the vasoconstrictor effect of small, but not of large, doses of acetylcholine? And again, would not acetylcholine, if liberated by the vagus nerves in unusually large amount, mobilize in its turn an excess of histamine which might disturb the blood circulation in certain regions of the gastric mucosa? Vagal stimulation seems always to produce vasodilatation and not vasoconstriction in the blood vessels of the stomach (Stahnke,[69] Vineberg[70]). The results of experiments carried out by Dr. Vineberg in my laboratory are very convincing. A glass window was sewn into the wall of the stomach of a dog. The vagi were stimulated rhythmically in the neck with an induction current. The resting gastric mucosa was, as usual, faintly pink and slightly moist, but after 20 minutes' stimulation became a deeper pink, almost rose-coloured, and a clear fluid commenced to well from the interrugal crypts. It was first noted long ago by Beaumont[71] and is now a fact of common knowledge that in an active stomach the mucous membrane takes on a bright pink colour. Whether this vasodilator effect produced by the vagus and probably by some of the chemical stimuli of gastric secretion could under certain circumstances be replaced by a vasoconstrictor effect, causing long-continued spasm of the small arteries, remains to be proved.

In following the above discussion one must avoid a possible misconception. It was never supposed by us that histamine is the sole cause of ulcer formation, nor that every ulcer invariably begins through a disturbance of the circulation in the gastro-intestinal mucous membrane and consequent formation of an erosion which develops into a chronic ulcer. In other words, we have not committed ourselves to any one particular theory of ulcer formation. The first point has been emphasized several times in this paper. With regard to the second point there are two chief opinions as to the causation of peptic ulcers. One view, which is supported by the many brilliant experiments of Mann and his co-workers,[56] is that there must always be an external factor responsible for initiating in the mucous membrane the pathological process that leads to the formation of an ulcer. According to Mann, the primary factor in the causation of peptic ulcer is the acid of the gastric juice. The mechanical factor is also of great importance. The site of the lesion is never in the fundus, but always in the pathway along which the gastric contents pass to the duodenum. It begins on the surface of the mucosa as a small circumscribed area covered with grey

mucosal cell débris. This is the type known as "marginal ulcer" (other names for it being "recurrent ulcer", "jejunal ulcer"), which was first produced experimentally in the jejunum in 95 per cent of dogs operated on by Mann and Williamson.[72] All the modifications of this experiment since performed by many investigators had the common aim of subjecting the intestinal mucous membrane, unprotected by alkaline duodenal juices, to the action of the acid gastric chyme, especially in combination with the rough mechanical effect of food. Mann[56] was also able to produce a subacute or chronic ulcer not far from the line of the lesser curvature in dogs after about four weeks' daily continuous (8 hours') introduction of 0.4 per cent HCl into the empty stomach. In connection with Mann's data it is important to note that in experimental physiological literature a controversy is being waged concerning the rôle which an excessive amount of gastric secretion in the stomach may play in the genesis of gastro-duodenal ulcers. Silbermann[73] was able to produce from the second week onwards multiple erosions, and from the third week onwards regular gastric or duodenal ulcers, by sham-feeding fasting dogs three times daily. Schmidt and Fogelson,[73] who repeated Silbermann's experiments and prolonged them up to 102 days, observed no changes in the gastric mucosa and only minor degrees of duodenitis. Administration to dogs of 300 c.c. of 0.36 to 0.5 per cent HCl twice daily in addition to sham-feeding did not alter the above results. Orndorff, Bergh and Ivy[75] were unable to produce in dogs chronic gastric and duodenal lesions by administering large doses of histamine or pilocarpine, or of the two drugs combined, for long periods of time (up to 66 days).

In the formation of another type of ulcers, especially those which are located in the stomach, a prerequisite seems to be some circulatory disturbance of a major or a minor nature leading to an erosion of the mucous membrane or to a deeper penetrating infarct. According to Hauser[53] (p. 684 ff.) it is improbable that a simple erosion may give rise to a peptic ulcer. He believes a typical ulcus simplex develops as a rule from a hæmorrhagic infarct reaching at least to the submucous membrane. On the other hand, Aschoff[52] thinks a peptic ulcer may develop from an erosion. Whether the pepsin and hydrochloric acid participate later on in the formation of the actual ulcer by digesting the damaged mucous membrane, or whether some other factors besides the gastric juice are responsible for its development, is of secondary importance for the understanding of the mechanism of the genesis of an ulcer. The initial and paramount factor in the pathogenesis of this type of ulcer, however, is in all probability some specific pathological condition of the blood supply to the gastro-duodenal wall. This theory is upheld by a great many pathologists and clinicians, *e.g.*, Hauser,[53] Aschoff,[52] Robertson,[76] Ricker,[50] von Bergmann,[43] von Bergmann and Katsch,[44] and others.

Histamine may play some part in the origination of this type of ulcer. One of the possible causes of the formation of a mucosal erosion, as was shown above, might be an excessive liberation of histamine in the gastric mucosa resulting from abnormalities of the gastric secretory mechanism. The destructive process would be completed by the action of the gastric juice on the defenceless mucous membrane, resulting in the formation of ulcus rotundum. To quote the words of Aschoff,[57] "*Der Magensaft ist das wirksame Prinzip im Guten wie im Bösen.*"

The overactivity of the vagus in regions not secreting acid gastric juice (the pyloric region and the initial part of the duodenum) might possibly also be a cause of excessive liberation of histamine with consequent formation of erosions. In these regions the acidity of the gastric contents is still very high and their peptic power has not yet been greatly diminished by bile and pancreatic juice, as it will be when they reach the lower part of the duodenum and the jejunum. Therefore in the former location an erosion may the more readily be converted into an ulcer.

All the considerations discussed above point to the important rôle played by the histamine or histamine-like substances of the gastric mucosa under physiological and some pathological conditions. Neither its useful nor its noxious effects should be overlooked.

CONCLUSION

It has been demonstrated above that histamine is present in the gastric juice, whether the secretion is stimulated by subcutaneous administration of histamine, by electrical stimulation of the vagi, or by sham-feeding in dogs with œsophagotomy and a gastric fistula. The concentration of the histamine equivalent of the

gastric juice increases or diminshes with the increase or diminution of the rate of secretion of the gastric juice. The source of the histamine equivalent of the gastric juice is presumably the gastric mucosa itself. On the basis of these and other considerations which are discussed in detail in the text the theory is advanced that the secretory fibres of the vagi during activity liberate histamine or histamine-like substances which stimulate the parietal cells. Since histamine has a strong effect on the blood vessels, and is able to produce stasis in the capillaries, which may lead to the formation of erosions in the gastric mucosa, it is emphasized that in considering the causes of peptic ulcer formation the possible rôle of histamine must not be overlooked. This is not a new theory of the pathogenesis of peptic ulcer, but an attempt to evaluate some of the consequences of abnormal functioning of the gastric secretory mechanism.

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HEPARIN AND THROMBOSIS. — When the work on heparin in the University of Toronto was commenced in 1929 it appeared that two main problems had to be solved before the effect of this substance could be studied in human subjects in whom thrombosis was feared. The first was the elimination of toxic material associated with the active principle; the second had to do with the investigation of the effects of heparin on thrombosis produced experimentally. As a result of publication of the recent observations on experimental animals a great many enquiries have been received from clinicians and D. W. G. Murray and C. H. Best hope that some of the questions raised can be answered here. While there are a number of clinical conditions in which the effects of heparin might prove of interest, the attempt to influence the incidence of post-operative embolism seemed to them the most satisfactory method of approach to the general problem. Two hundred and twenty-two patients have now received heparin after operation in the department of surgery, but it is obvious that many times this number must be studied before any conclusion as to its efficacy in preventing thrombosis can be reached. There is as yet no proof that heparin will prevent the formation of a thrombus in the human subject. To facilitate the work of others the following brief notes on their method of procedure are given: The heparin solution is added to an intravenous saline drip. The saline and heparin mixture is allowed to run into the vein at such a rate that the clotting time of the patient's blood is maintained at about 15 minutes. The rate of administration of saline solution may be 25 drops per minute, but this varies greatly from case to case. The injection of heparin is now being restricted to those cases in which very extensive surgical procedures have been carried out. The injection is continued for varying periods up to 14 days after the operation. The level of the clotting time of the patient's blood after the operation may be used as a guide in determining the initial rate of injection of heparin.—*J. Am. M. Ass.*, 1938, **110**: 118.

PAINLESS, BLOODLESS, AND SAFE HÆMORRHOIDECTOMY*

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HÆMORRHOIDS are among the most common of adult affections. Very few people over the age of forty have not had at some time rectal trouble of some kind, and nearly all diagnose the symptoms as due to piles.

The discomfort and inconvenience due to hæmorrhoids are well known, and for years irregular practitioners have thrived on the non-operative treatment of this condition. The proprietary drug houses, by dispensing ointments, pills and salves, have found piles a very lucrative source of income. Why should the public seek aid elsewhere than from the medical profession? Because the operation as generally performed a few years ago, and frequently now, was done unskilfully, was mutilating, was excruciatingly painful afterward, and sometimes left the patient in a worse condition than when he sought the advice of the surgeon. Those of us who specialize in proctology are faced constantly with problems instigated by surgeons who have hurriedly or carelessly performed a hæmorrhoidectomy and left the patient perhaps with incontinence, stricture, or a permanent tender extrusion of the mucous membrane.

This paper will not discuss the injection treatment for hæmorrhoids, which in selected cases and when skilfully done is excellent, but should only be recommended as a palliative measure. A method for hæmorrhoidectomy is described for which no originality is claimed, but which in the writer's hands has been found painless, without danger, and successful in practically every case. One will not discuss the diagnosis of the disease and the importance of a thorough sigmoidoscopic examination of each patient before operation. Of course all patients with any rectal trouble should be thus examined to rule out malignancy or some other lesion which has been diagnosed hæmorrhoids or may be coincident with this trouble. Any type of hæmorrhoids, whether protruding or not, is suitable for the technique about to be described.

Pre-operative care.—Two nights before operation the patient is given a good laxative, preferably castor oil, but if he prefers some other laxative which will be effective it may be substituted. The next day, the day before operation, he is given two enemata, one in the morning and one in the evening, and allowed to go to the toilet to expel it. For a cleansing enema, in place of the usual soap and water, we prefer one prepared by adding one ounce of peroxide of hydrogen to the pint of water. If one examines the rectal mucous membrane following a soap and water enema the congestion from the irritating soap is surprising. Hydrogen peroxide and water is not irritating. An enema is never given on the morning of the operation. In preparing the operative area clipping of the hairs is all that is necessary.



Fig. 1



Fig. 2

Fig. 1.—Method of injecting the local anæsthetic through one needle puncture.

Fig. 2.—Method of ligaturing the base of a hæmorrhoid, with one Pennington forceps held down by a hooked weight.

* Presented at a staff meeting at St. Joseph's Hospital, Hamilton, Ont., February 8, 1938.

For pre-operative sedation nembutal, gr. 1½, and chloretone, gr. 10, are given the night before and repeated one hour before the operation. Following this the patient is usually quite drowsy.

Operative procedure.—Usually the most convenient position for a rectal operation is the left Sims, that is with the right knee flexed on the abdomen, the left leg extended, and the left arm behind on the table, although in stout people or those with large hips the prone position, with the pelvis raised on a padded kidney bar or a couple of sandbags is very satisfactory. Local anæsthesia is perfectly satisfactory for practically all operative procedures on the rectum, excluding of course large resections or operations where there is advanced infection. Where the patient is nervous light cyclopropane or nitrous oxide may be used until the local anæsthesia is completed. One may use spinal or caudal or transsacral block; the latter, although without danger, is time-consuming and painful. For local anæsthesia novocaine, ½ per cent, is used with ¼ per cent of quinine and urea hydrochloride. The latter salt is added because of the prolonged anæsthesia which it induces, 4 to 5 hours, a very important consideration in hæmorrhoidectomy.

At a point ½ inch posterior to the anal margin in the centre line an applicator dipped in pure phenol is applied to a minute area, and through this the local injection is made. Using a 21 gauge 3 inch needle one injects the external sphincter on both right and left sides. When it is necessary to refill the syringe it is detached from the needle; thus only one puncture is necessary. These injections are made with the left gloved finger in the rectum to prevent any possibility of the needle puncturing the mucosa. Through the same needle the skin margins of the anus are now infiltrated with anæsthetic. Sometimes it may be necessary to make an anterior puncture and inject the sphincters from there. Waiting a few minutes, the anus will be relaxed and the hæmorrhoidal masses may be plainly visualized. One of the hæmorrhoids is now injected at the base with the anæsthetic until it swells like a grape. A Pennington forceps now grasps the anal margin, proximal to the injected hæmorrhoid, and this is usually held by an assistant, but I find that by attaching a hooked weight to this it is equally satisfactory (Fig. 2). When a Pennington is attached to the upper margin of the anus a hooked chain with a weight on the end may be attached to the Pennington and this thrown over the thigh. These weights take the place of a pair of assistant's hands. The most dependent part of the hæmorrhoid is then grasped with a pair of curved tonsil forceps and extruded, and a curved blunt needle threaded with No. 1 catgut is passed beneath the mucous membrane, including the base of the pile, and brought through on the other side. It thus includes the mucous membrane and the vessels immediately beneath. The ligature is now firmly tied. This procedure may be used on all the piles, and in a few minutes the same result has been accomplished as one obtains by injection in 3 or 4 weeks. If no further surgery is done there may be some swelling for the first day or two, but the tumour gradually shinks and in a short time disappears entirely. This is excellent treatment where any cutting is contraindicated, and where for some reason injection cannot be carried out.

Where one wishes to excise the hæmorrhoids, and this is a much more satisfactory operation, they are dissected up toward the pedicle and grasped with a curved forceps or a regular pile forceps, and the protruding masses excised. One end of the catgut suture is threaded on a curved needle and a couple of turns are made around the forceps, which is withdrawn, and the two ends of the suture are tied firmly.

A careful examination is now made through the proctoscope for any bleeding. Using the above technique, there is practically never any bleeding even during the operation. One now injects an ounce of oil into the rectum, and a gauze pack saturated in liquid paraffin may be left in for a few hours. Frequently we find that a compress of eucupin di-hydrochloride, 1 per cent, over the operative area will prevent any pain, but it is seldom necessary. Five c.c. of Morgan's solution[1] is injected into areas on the right and left and posterior to the anus and thoroughly massaged. These areas through which sensory branches from the sacral roots reach the anus are without sensation for days following these injections.

Post-operative procedure.—The patient returns to his bed and lies on his face with the buttocks raised on a pillow, and moist com-

presses of witch-hazel or, preferably, eucupin, 1-100, are kept on the operative area. He may rise to micturate, and if he has difficulty a sitz bath will help. On the second day he is given full diet, and the third night a laxative is given and usually he may go home on the 4th day. We usually begin liquid paraffin every night following the operation, and this should be continued for a week or so. For local tenderness, as a lubricant I have been using with very satisfactory results an ointment of eucupin, 1 per cent, in eucerin.

Note.—Since preparing the above paper, following methods advocated by Manheim and Marks,[2] I have been using for local anæsthesia novocaine, 1 per cent, with eucupin, 1-1000, and find it even more efficient than the procedure described in the paper.

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KRAUROSIS, LEUKOPLAKIA AND PRURITUS VULVÆ: TREATMENT BY RESECTION OF THE SENSORY NERVES OF THE PERINEUM*

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THIS article is a report regarding resection of the sensory nerves of perineum in cases of kraurosis, leukoplakia and pruritus vulvæ with lichenification.

There is much confusion in the literature concerning the definition of the terms. Montgomery and his co-workers[1] have given us an exhaustive clinical and pathological study of the whole subject. They believe that the three conditions represent distinct entities and that one may occur independently of either of the other two. It is true, too, that two or all three of the conditions may be present clinically or pathologically, or both, and may merge with one another, especially as all three are likely to appear in the late decades of life. This merging of the three conditions accounts for the confusion in terminology.

Darier's definition of kraurosis cannot be improved upon: "The term kraurosis should be confined to a sclerosing progressive atrophy of the mucocutaneous teguments of the vulva, leading gradually to stenosis of the vaginal orifice, the disappearance of the labia minora, the frenulum and the clitoris and flattening of the labia majora. The mucosa of the parts involved is always shining, smooth and dry. The colour is white, waxy yellow, red or spotted. Complication by leukoplakia is frequent."[2]

The histopathological changes in kraurosis are essentially those of an atrophic process. There is relative and often absolute hyperkeratosis, with little change in the stratum granulosum. There are marked atrophy of the prickle-cell layer and liquefaction necrosis of the basal-cell layer; an area of œdema just beneath the epidermis with œdema and homogenization of the connective-tissue fibres; obliteration of the rete ridges as a result of the œdema; homogenization of the connective-tissue in the upper portion of the cutis; a perivascular infiltrate in the mid-cutis composed of lymphocytes and later fixed connective-tissue cells; there is more or less atrophy of the epidermal appendages. In the later stages a varying degree of parakeratosis is present and sclerosis of the deeper vessels may occur.

Leukoplakia of the vulva presents features comparable to leukoplakia of the mouth. Clinically, it occurs as single or multiple discrete plaques involving the inner surfaces of both labia, the perineum, and the clitoris, or the vaginal mucosa. Leukoplakia is prone to occur near the clitoris and on the perineum and inner surfaces of the labia minora. It is in these sites that the pruritus is most intense. It is greyish to greyish-blue in colour, with a thickening of the skin or mucous membranes with no scaling. As the leukoplakic process progresses the epidermis becomes markedly thickened and fissures or ulcerations may appear.

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The histopathological change in leukoplakia is essentially a hypertrophic process. There is early hyperkeratosis, an increase in the stratum granulosum, acanthosis, and relatively little change in the cutis. Soon one sees a perivascular as well as a diffuse infiltrate, chiefly lymphocytic, in upper portions of the cutis, with varying degrees of liquefaction-necrosis of the basal cell layer. Dependent on the degree of infiltration in the cutis, a varying degree of destruction of the elastic tissue occurs, and different degrees of fibrosis with obliteration of the lumina of the superficial vessels may be seen.

Persistent and chronic pruritus vulvæ results in lichenification, with most frequently involvement of the outer aspects of the labia majora, about the pubic hairs, the inner aspects of the thighs, and also the anus. At times the inner surfaces of both labia, the clitoris and the perineum may be involved. Clinically, one finds discrete or diffuse plaques of thickening of the skin, with accentuation of the normal markings. When moisture is present, the lesion assumes a whitish soggy appearance.

Histopathologically, there are hyperkeratosis alternating with parakeratosis, acanthosis with prolongation of the rete pegs, elongation of the papillary bodies and a mild perivascular lymphocytic infiltrate in the upper part of the cutis, with some dilatation of the superficial vessels. No liquefaction necrosis of the basal cell layer is present. There are no appreciable changes in either connective or elastic tissue. Pruritus is the predominant symptom in all these conditions.

Little is definitely known as to the etiology of the various lesions grouped under pruritus vulvæ. It is worthy of note, however, that the general distribution on the affected area corresponds geographically with the so-called sex skin in the primate. It is possible that certain persons possess to a degree an area about the external genitalia which responds to the œstrin tide as does that of the monkey. At or after the menopause such tissue undergoing certain structural changes possibly gives rise to the various clinical entities herein described. On the other hand, only a small percentage of those suffering from pruritus are relieved by the administration of œstrogenic substances at present available. Such an observation, however, does not wholly disprove the general thesis of the relationship of regressional changes in the vulva to alterations in the physiological activity of the glands of internal secretion.

TREATMENT

In the past treatment has consisted in the local application of ointments and lotions, while x-ray and, more recently, the glandular extracts have been extensively employed. Since August, 1934, resection of the sensory nerves of the perineum has been performed on 8 patients in whom pruritus proved refractory to non-surgical measures. The technique described by Learmowth, Montgomery and Counseller,[3] with but minor modifications, was adopted.

Sensory nerve resection has been practised sporadically during the past eighty years or more. It is interesting to observe that Sir J. Y. Simpson[4] employed a technique for nerve resection described by Dr. Burns, of Glasgow, in his "Principles of Midwifery". Since the perineal area is not supplied by a single nerve, but rather by branches of five different nerves, namely, the ilio-inguinal and genito-crural nerves, dorsal nerve of clitoris, superficial perineal nerve, pudendal branch of small sciatic nerve, and inferior hæmorrhoidal nerve, identification of these obviously offers a major anatomical problem.

While it is true that regressional changes do occasionally follow perineal sensory nerve resection, one must not lose sight of the fact that carcinoma in this region commonly follows leukoplakia, with pruritus the only symptom and excoriation from trauma the only visible lesion. On the other hand if the biopsies taken at the time of the nerve resection do not reveal malignancy this procedure will relieve symptoms and does not preclude vulvectomy (an operative measure of a definitely radical nature) for carcinoma of the vulva if and when it is detected.

CASE 1

Mrs. A.K., aged 35, presented herself at the dermatological out-patient department of the Montreal General Hospital with pruritus of the vulva of six years' duration. Examination revealed a single patch of lichenification on the mons veneris. In 1935 an artificial irradiation menopause had been produced with no effect on the pruritus. Examination otherwise revealed normal findings. Biopsy of the affected part showed the typical histopathological feature of lichenification. Section of the perineal and pudendal nerves was performed in June, 1936. There was immediate relief from the pruritus and disappearance of the local lesion. To date, twelve months later, there has been no recurrence.

CASE 2

Mrs. J.W., aged 63, whose menopause had occurred at the age of 45, was under treatment in the dermato-

logical out-patient department for four years with an erythemato-squamous eczema of the crural region, the lower abdomen and labia majora. There was a great deal of thickening of the parts and the pruritus was extreme. Local therapy, irradiation and various diets, including a low carbohydrate diet because of a blood sugar reading of 0.131 mg. per cent, were of little benefit. Physical examination otherwise revealed normal findings. No biopsy was performed. Section of the sensory nerves of the perineum was performed in September, 1934. The patient remained well for the ensuing twelve months, at which time she disappeared from observation.

CASE 3

Mrs. E.C., aged 47, was under observation for 15 years for an intractable pruritus of the vulva which was so severe as to cause considerable loss of sleep. Her menopause occurred three years subsequent to the onset of the pruritus. Examination of the genitalia in September, 1934, revealed an outlet small and shrunken, with disappearance of the labia minora. The vestibule was pale and flat-surfaced, and this pale atrophic surface extended along the inner sides of both labia majora to include the clitoris. There was a small patch of leukoplakia on the inner aspects of the labia minora. Physical examination, including blood sugar, was otherwise normal. Section of a piece of affected tissue showed the histopathological features of kraurosis vulvæ (Fig. 1). Section of the perineal nerves was performed in September, 1932. With the exception of mild pruritus in April, 1937, due to a vaginitis, there has to date been complete relief from subjective symptoms. There had been no change in the appearance of the kraurosis, but the leukoplakia had disappeared.

CASE 4

Mrs. B., aged 48 (patient of Dr. J. F. Burgess), came under observation in March, 1936, for pruritus vulvæ et ani. Examination showed the presence of erythematous lichenified eczema of the groins and labia majora and in the region of the mons veneris. The anal pruritus dated back to the days of her youth, while the pruritus vulvæ first appeared in 1929. Local applications, including x-ray therapy, had been of only temporary benefit, and for the four months prior to observation the pruritus had been so severe as to require sedatives for its relief. Physical examination, including blood sugar estimation, revealed normal findings. Nerve resection was performed on March 25, 1936, with immediate relief from the pruritus. She reported by letter, dated May 6, 1937, that marked relief from the pruritus persisted in spite of the presence of some erythema in the groins.

CASE 5

Mrs. C.W., aged 49 (case of Dr. R. Powers), suffered from pruritus vulvæ of eleven years' duration which caused loss of sleep and extreme irritability. Menstruation was still normal and physical examination revealed no pathological change except lichenification of the outer aspects of the labia majora. Nerve resection was performed by Dr. Powers in October, 1935, and to date there has been complete relief from the pruritus with disappearance of the lichenification. No biopsy was performed.

CASE 6

Mrs. W.B., aged 53, complained of pruritus vulvæ of ten years' standing. Examination revealed the picture of kraurosis vulvæ and secondary lichenification, with physical findings otherwise normal. Attempts at resection of the nerves were on two occasions only partially successful. There was only partial relief from the pruritus which still persisted to a somewhat lesser degree at the date of writing. Histological examination of tissue showed in two different sections both kraurosis and lichenification (Fig. 2). Lack of success in this case could be attributed to failure to excise all the nerves.

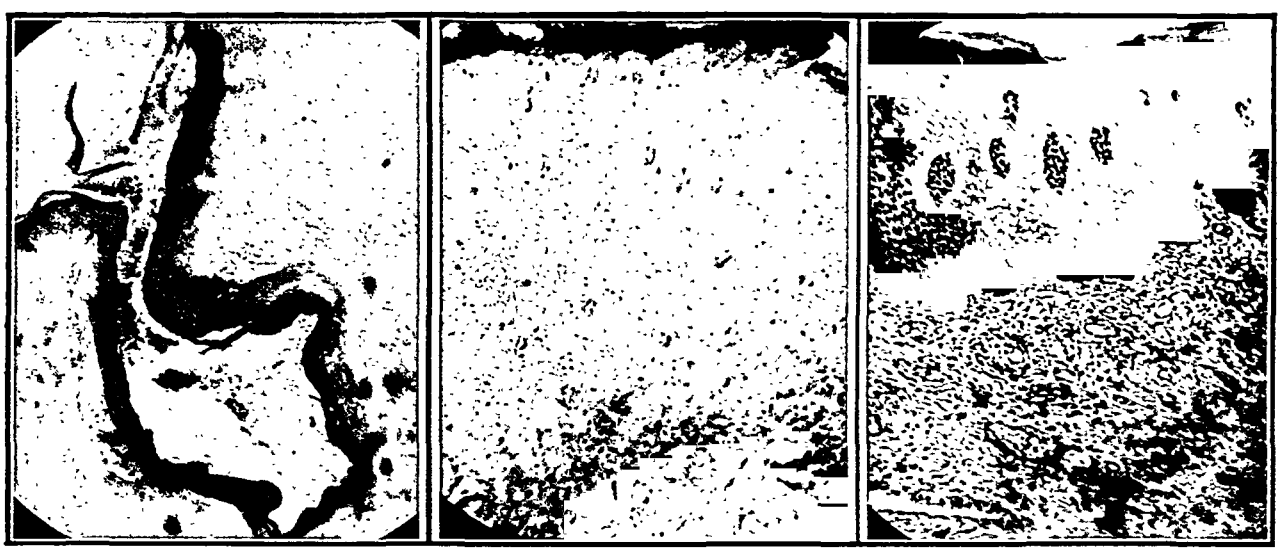


Fig. 1 Fig. 2 Fig. 3

Fig. 1 (Case 3).—Typical histological picture of a case of kraurosis vulvæ, showing hyperkeratosis, atrophy of prickle-cell layer and œdema and homogenization of the connective-tissue. Fig. 2 (Case 6).—Histological picture of a case of kraurosis vulvæ. Note the collection of lymphocytes in the lower right corner. Fig. 3 (Case 8).—Histological picture of neuro-dermatitis of the vulvæ showing acanthosis, papillomatosis, dilated capillaries and lymphocytic infiltrate.

CASE 7

Miss Vera S., aged 29, was seen for a pruritus vulvæ of two years' duration and pruritus ani of ten years' duration. Nerve section was performed in January, 1937. There was complete relief of her symptoms at the time of discharge from the hospital. No follow-up has been possible in this patient.

CASE 8

Mrs. H.A., aged 37, complained of pruritus vulvæ of nine months' duration. There was no response to progynon and ointments applied locally. Physical ex-

amination revealed lichenification of the outer aspects of the labia majora with nothing of significance otherwise. Histopathological examination showed lichenification (Fig. 3). Section of the sensory nerves was done in November, 1936, with complete relief from pruritus and no recurrence at the time of writing.

Resection of perineal and pudendal nerves of the perineum has been performed on eight patients, six with lichenification and two with kraurosis vulvæ. These patients have been observed for periods ranging from five months to two and one-half years. In cases 1, 2, 4, 5 and 8, complete relief was obtained for periods varying from five months to two and one-half years. In case 3 there was complete relief for two and one-half years, when vaginitis and leucorrhœal discharge resulted in a slight recurrence which rapidly subsided under appropriate treatment. It was also noted that the leukoplakia patch had also disappeared. In case 6 the nerves could not be completely excised. In case 7 relief from symptoms was obtained, but the period of postoperative observation is as yet too short to determine the outcome. Thus in all our cases where resection of the nerves was complete the results were most gratifying. It is true, however, that the majority of these patients have not been followed sufficiently long to determine the permanency of relief. It must be pointed out that in the majority of cases operated upon local applications, x-ray therapy, and endocrine therapy had been previously employed without success.

We wish to point out that results depend on the care taken to exclude those patients with conditions which contraindicated operation: (1) those with local or general disturbances which might produce vulvar pruritus; (2) those showing malignant changes or severe radiodermatitis; (3) markedly obese patients. In one such case where it was attempted the nerves could not be completely removed; (4) psychoneurosis.

CONCLUSION

Kraurosis vulvæ, leukoplakia and pruritus with lichenification are distinguishable from one another on clinical and pathological grounds. In many cases all three may merge.

Resection of the sensory nerves of the perineum is contraindicated in the presence of malignant change or actinodermatitis. Resection is also contraindicated in the presence of psychoneurosis.

Resection is definitely the treatment of choice in cases refractory to other methods of treatment. It affords immediate and permanent relief in a large percentage of selected cases. It is therefore felt that such a procedure, by relieving the irritation and constant trauma from scratching, possibly prevents subsequent carcinomatous change developing in the area involved. It is worthy of note that in one patient with kraurosis vulvæ and secondary leukoplakia, regression of the leukoplakia resulted.

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XANTHOMATOSIS OSSIUM*

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MANY of the conditions of generalized bone disease present no difficulty of diagnosis and respond to a particular plan of treatment. This is particularly true of the generalized bone disease known as osteitis fibrosa cystica, also spoken of as Recklinghausen's disease or hyperparathyroidism. The diagnosis is based on the finding of cystic lesions in the bones by x-ray examination, together with the associated blood picture of hypercalcæmia and hypophosphatæmia, plus increased excretion of calcium in the urine leading to a negative calcium balance. The removal of a parathyroid tumour is followed by a rather remarkable recovery.

If, on the other hand, the cystic bone lesions are accompanied by exophthalmos, diabetes insipidus, and xanthomatosis cutis the condition of Schüller-Christian disease is readily recognized, and the finding of "foam cells' by biopsy substantiates the diagnosis. However, patients with generalized bone disease are met with from

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division of an old tumour cell, while the xanthoma grows by the addition of new cells from without the mass. These deposits, according to Spranger, are due to a disturbance in the stability of the emulsion of cholesterin and fat in the blood. Chester therefore proposes to change the name "xanthoma" to "lipoid granuloma", which consists of (1) lipoid cells, which are the specific part of the granuloma; (2) exudate cells which are reaction of the tissue to the presence of noxious lipoids, and (3) connective tissue which acts in healing of the lipoid granuloma. Further, Snapper states that Schüller-Christian's disease is not a separate entity but merely a manifestation of xanthomatosis ossium. He explains the accompanying diabetes insipidus as being due to xanthoma deposits in the sella disturbing pituitary function, and the exophthalmos as due to xanthoma deposits in the orbit, pushing the eye forward.

More recently a case has been reported by Teperson, which further substantiates the value of x-ray in these conditions and also stresses the importance of early treatment.

SUMMARY

1. Three cases of xanthomatosis ossium have been presented.

2. In all cases the difficulties of diagnosis and the importance of x-ray therapy have been stressed.

CARCINOMA OF THE AMPULLA OF VATER

(REPORT OF TWO CASES)

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THAT portion of the digestive tract between the pyloric sphincter and the ileo-cæcal valve is remarkably free from the development of malignant disease. Considering the great length of this part of the intestinal canal and the vast epithelial surface that it presents to the passing digestive stream, its comparative immunity to malignancy is a fortunate circumstance which is difficult for the pathologist to explain. The fact that immediately proximal to the pyloric sphincter and immediately distal to the ileo-cæcal opening we find in the stomach and in the large bowel two of the most frequent sites of cancer lends support to the theory that chronic irritation is an important factor in the etiology of malignancy. The intestinal content is much less irritating in the small bowel where it is in a fluid state than it is when first received in the stomach or when its residue is being prepared for evacuation in the colon.

When malignancy is found in the small intestine its most frequent location is in the second part of the duodenum, at the opening of the ampulla of Vater. This region, where the biliary and pancreatic secretions join the intestinal stream, is probably more subject to chronic irritation than any other point in the small bowel. Moreover it is a location which in embryonic development is the seat of great cellular activity in connection with the budding of the hepatic and pancreatic glandular epithelium. It is not unlikely, therefore, that the epithelial cells in the ampullary region retain throughout life greater potentialities for growth than those of any other part of the small intestine. Hoffman and Pack,[1] in a review of 228 reported cases of cancer of the small bowel, found that 104, or 45.6 per cent, were in the duodenum, so that, with relation to its length, cancer is many times more frequent in the duodenum than in the rest of the small intestine. Of these 104 duodenal cancers 61.9 per cent were at the ampulla of Vater.

The opening of the ampulla of Vater is situated in a small clitoris-like fold in the mucosa about the middle of the second part of the duodenum, at the junction of the posterior wall with the left border. The manner in which the choledochus and the duct of Wirsung terminate varies a great deal. They may unite to form an ampulla, or they may open separately at the apex of a small projection of duodenal mucosa. Carcinoma in the ampullary region may originate in the duodenal mucosa, in the ampulla itself, or in the terminal portion of the common or the pancreatic duct. Microscopically, these growths, no matter at what point they originate, are almost always adenocarcinomas

composed of cylindrical cells, except those originating in the duct of Wirsung which are composed of cells of a more spheroidal type.[2] It is not always possible for the pathologist to say whether a carcinoma of the ampullary region has originated in the cells of the terminal ductal epithelium or in those of the duodenal mucosa. Such a distinction is a matter of academic interest only, for they present the same surgical problem no matter what their origin. They are distinguished from carcinoma of the head of the pancreas by the fact that they do not invade that gland but form a globular protrusion into the duodenal lumen, which is quite freely movable and not fixed to the posterior abdominal wall like a pancreatic malignant growth. The relative frequency of ampullary cancer compared with cancer of the head of the pancreas is illustrated by a series of 179 cases of cancerous obstruction of the terminal portion of the common duct reported by Judd and Hoerner,[3] in which 158 were cancer of the head of the pancreas and 21 were cancer of the ampulla of Vater.

There are two characteristics of ampullary carcinoma which make it a condition favourable for early diagnosis and successful surgical treatment. The first is that the growth reveals its presence at an early stage by obstructing the biliary outflow and producing jaundice. The bile is secreted by the liver cells at a very low pressure, so that it requires only a moderate degree of compression at the terminal part of the common duct to produce a noticeable degree of jaundice. The second favourable characteristic of these growths is their low degree of malignancy. They are very late in metastasizing, and almost invariably, if left untreated, will cause the patient's death from biliary obstruction before metastasis has taken place. Perry and Shaw[4] in 15 cases coming to post-mortem found metastasis in only 3, and Cohen and Colp[5] in 4 cases coming to post-mortem found no metastasis.

The symptoms of carcinoma of the ampulla of Vater in no way differ from those enumerated by Courvoisier as being present when the common bile-duct is obstructed by a malignant growth— (1) constant, painless, afebrile jaundice; (2) a distended gall bladder; and (3) emaciation. All cases will not conform exactly to this clinical picture. In some pre-existing gall-bladder disease may have produced such a degree of fibrosis in the gall-bladder wall that it cannot become distended. Gall stones are not very often associated with ampullary cancer but have been found to be present in about 20 per cent of cases; when present they may complicate the clinical picture by producing pain. Pain is also quite likely to appear in the later stages of the disease when the growth has become large enough to act as a foreign body in the duodenum and set up spasm in the musculature of the duodenal wall above the ampulla. This latter type of pain is likely to be accompanied by vomiting. The emaciation, clay-coloured stools, itching of the skin, and other symptoms of cholæmia do not distinguish this condition from any other obstructive jaundice. Diarrhœa, due to pancreatic obstruction interfering with the digestion of fats, is a frequent symptom, having been noted by Denechau as present in 11 out of 17 cases.

A definite diagnosis of carcinoma of the ampulla of Vater has rarely if ever been made except at operation or autopsy. The clinical picture usually enables one to make a diagnosis of cancerous obstruction of the common duct. It might be possible in cases where an ampullary carcinoma has attained a considerable size for the roentgenologist to demonstrate its presence in the second part of the duodenum. In case 2 here reported, although the growth was a pedunculated mass 5 cm. in diameter and 3.5 cm. in thickness its presence was not noted in a gastro-intestinal x-ray series taken two weeks before operation. Diagnosis at the time of operation depends on palpating the growth through the duodenal wall. Its mobility and the manner in which it bulges into the duodenal lumen distinguish it from the much harder, fixed retro-duodenal mass produced by carcinoma of the head of the pancreas. In some cases ampullary cancer produces jaundice before it has reached a size large enough to make it definitely palpable through the duodenal wall. When in doubt, or when no other cause of obstructive jaundice can be demonstrated, the surgeon should not hesitate to open the duodenum for visual inspection of the ampullary region.

Before discussing the treatment I wish to record the histories of two cases of carcinoma of the ampulla of Vater that have come under my care recently.

CASE 1

A.S., male, aged 44, consulted me on May 25, 1935, giving the following history. He was born in Syria and had been in Western Canada since 1918, a merchant by occupation. His family history was negative, and prior to his present illness he had always enjoyed good health, with the exception that he had a tape-worm for many years. He first noticed pieces of this tape-worm in his stools in 1917, and continued to see them frequently till 1933. He has seen none in the last two years.

His present illness commenced in the spring of 1934, when he began to have "stomach trouble". This consisted of a sense of fullness after eating, much "gas on his stomach" and some loss of appetite. In the fall of 1934 his friends began to tell him that his colour was bad and he noticed that his urine was very dark. During this time his stomach trouble had become steadily worse, and he had lost twenty pounds in weight but had no pain at any time. In January, 1935, he first consulted a doctor, and was taken to a hospital where an operation was performed for drainage of his gall bladder. For two months after this operation he improved a great deal, his appetite returned, and he gained a little weight. The bile drained freely from the incision for two months and then the opening began to close and drain only at intervals. Coincident with the cessation of free drainage of bile from the sinus all of his symptoms returned, so that he disposed of his business and came east.

Examination on May 25, 1935.—The patient was deeply jaundiced, of a greenish yellow colour, and his skin was covered with scratch marks. His head and neck were negative. The heart and lungs were normal. Abdomen: there was a scar of a recent incision in the upper abdomen, two inches to the right of the mid line. A pin-point opening in the centre of the scar was discharging a small amount of green bile. The liver edge was palpable two inches lower than normal. No tumour masses could be felt, and there was no tenderness on palpation. The sinus was dilated with a hæmostat and a small catheter inserted four inches deep. Dark green bile flowed freely from the catheter. A solution of sodium iodide was injected through the catheter and an x-ray plate taken. This demonstrated the gall bladder, common and hepatic and intra-hepatic ducts to be tremendously dilated. Biliary drainage was maintained through this catheter for eighteen days, and two blood transfusions were given before operating. After the second blood transfusion his hæmoglobin was 80 per cent; red blood cells 4,432,000; white blood cells 8,900; clotting time 8 minutes.

Operation, June 12, 1935, at the Metropolitan Hospital under spinal anæsthesia.—The gall bladder was detached from the sinus in the abdominal wall. The common duct was opened and explored. It was large enough to admit the index finger. No stones were found. Palpation of the second part of the duodenum revealed a tumour mass the size of a walnut protruding into its lumen from its posterior wall. The duodenum was opened by a vertical incision in its anterior wall and the tumour found to be at the ampulla of Vater. No attempt was made to remove the tumour. A small portion of it was excised for biopsy, and the gall bladder was anastomozed to the opening in the anterior duodenal wall. The pathological report on the section of tissue removed was adenocarcinoma, grade 1. The patient made an uneventful recovery and was alive and well when last heard from in June, 1937, two years after operation.

CASE 2

L.N., female, aged 67, was admitted to the Metropolitan Hospital on July 15, 1937, with the following history.

Complaints.—Painless jaundice for three months; persistent itching of the skin for the previous month; no appetite for six months, with 30 lbs. loss of weight; epigastric pain, vomiting and diarrhœa for the past three weeks. The points of interest in her family history are that her mother died at 73 of cancer of the bowels and a sister at the present time has cancer of the cervix uteri. The patient has five children and has had no illness since childhood.

The present illness commenced six months before admission, when she lost her appetite and began to have indefinite distress and fullness after eating. She felt weak and began to lose weight. About three months before admission her family noticed that her colour was yellow; this yellowness has been increasing. Her bowel movements were light-coloured and her urine was dark. A month ago her skin began to itch all over. For the previous three weeks she had had considerable pain in the pit of her stomach and occasional vomiting, which relieved the pain. For the past two weeks she had had diarrhœa in the mornings, having ten or twelve small watery, light-coloured movements



Fig. 1 Fig. 2 Fig. 2a Fig. 2b Fig. 3

Fig. 1.—X-ray picture of case 1, taken after injecting sinus with sodium iodide solution showing the great distension of the gall bladder, common duct and intra-hepatic radicles. Figs. 2 and 2a.—Two views of tumour removed from case 2, on the left a side view of the tumour with pieces of rubber tubing inserted through the common and pancreatic ducts, on the right a view showing base of tumour with tube ends protruding from the duct openings. Fig. 2b.—Tumour from case 2 bisected along line of ducts. The common and pancreatic ducts are seen in their course through the tumour. Fig. 3.—X-ray picture of case 2 taken four weeks after operation showing catheters still in place from common and pancreatic ducts into duodenum. Arrows point to upper and lower ends of common duct catheter and to upper end of catheter in the pancreatic duct.

until noon and two or three during the remainder of the twenty-four hours. She brought with her the report of a gastro-intestinal x-ray series, taken two weeks before admission, which was negative, and the report of a cholecystogram in which no shadow of dye in the gall bladder was seen.

Examination.—The patient was emaciated, deeply jaundiced, and covered with scratch marks, some of which were bleeding. The head, neck and chest were negative. In the upper right abdominal quadrant there was a large globular tumour mass which moved on respiration and was quite evidently a distended gall bladder. The abdomen was not tender on palpation. Further examination was negative. The hgb. was 63 per cent; red blood cells 3,712,000; white blood cells 10,100; clotting time, 7 minutes.

A blood transfusion was given and operation performed the day after admission, under spinal anæsthesia. The gall bladder was found to be distended and 150 c.c. of mucoid "white bile" that still retained a slight greenish tint were aspirated from it. The common duct was greatly dilated, and its aspiration produced the same type of bile, indicating that the liver cells had ceased secreting. On palpating the second part of the duodenum a large tumour mass could be felt filling its lumen. This mass was of the consistency of a rubber sponge, the size of a hen's egg, and was quite movable with the duodenum.

The second part of the duodenum was mobilized and opened by a vertical incision in its anterior wall. The tumour protruded through the incision. It was a pedunculated globular mass, somewhat flattened in the antero-posterior direction, and measured 5 cm. in diameter and 3.5 cm. in thickness. Its base was 1.5 cm. in diameter. A uterine sound, passed down through a small opening made in the supra-duodenal part of the common duct, came out through the centre of the tumour mass, demonstrating its ampullary origin. An incision was made in the posterior wall of duodenum around the base of the tumour, keeping 1 cm. clear of it, and the mass was excised together with a V-shaped portion of the head of the pancreas. Brisk hæmorrhage from two small arteries in the bed was controlled by suture without difficulty. The wide-open mouths of the common duct and the duct of Wirsung were plainly visible in the bed, and were stitched to the margins of the incision in the posterior duodenal wall. This incision was closed by Luken gut on an atraumatic needle, the stitches including the pancreatic V. A No. 16 catheter was pushed up in the common duct and a very small catheter in the duct of Wirsung. The distal ends of these catheters were left hanging down 4 inches into the duodenum. The opening in the anterior duodenal wall was closed by two rows of sutures and covered with a piece of omentum. A small T-tube was placed in the opening in the supra-duodenal part of the common duct. A blood transfusion was given after the operation. A nasal siphonage tube was placed in the stomach to keep it empty and 1,000 c.c. of 5 per cent glucose in normal saline were given every eight hours.

The post-operative course was smooth for five days, and then she began to bleed from the incision, from the stomach, from the bowel and from the kidneys. This bleeding continued for a week and at times became alarming. A daily blood transfusion was given for seven days. The bleeding then ceased and she made an excellent recovery. When she left the hospital at the end of the fourth week she was on light diet, feeling well, and rapidly gaining weight. An x-ray picture taken on the day of her discharge revealed the catheters still in place in the common and pancreatic ducts. The pathological report on the tumour was adenocarcinoma, grade 1.

In the treatment of carcinoma of the ampulla of Vater, surgical intervention, either palliative or curative, is the only thing that offers the patient any hope. The frequency with which patients suffering from cancerous obstruction of the common bile duct are permitted to die of the distressing symptoms of cholæmia without an attempt at surgical relief is to be deprecated. While it is true that in about 88 per cent of such patients the malignancy will be found in the head of the pancreas or in the duct above the ampulla and will not be amenable to curative surgical attack, a palliative anastomosis of the gall bladder to the stomach or duodenum will often be possible, and will not only lengthen the patient's life but will permit him to live in comfort instead of in the miseries of cholæmic pruritus. In about 12 per cent of cases of cancerous obstruction of the common duct the growth will be found at the ampulla of Vater, and one of three procedures will be available to the surgeon for its relief: (1) a palliative operation; (2) excision of the growth either as a one-stage operation or after a preliminary anastomosis of the gall bladder to the stomach or duodenum; (3) radical resection of the second part of the duodenum together with part of the common duct and part of the head of the pancreas as performed by Whipple, Parsons, and Mullins.[6]

The value of palliative side-tracking of the biliary stream has already been referred to and is well illustrated in case 1, where the patient is alive and well two years after operation. Judd and Hoerner[3] report one patient having lived free from symptoms for two years, and Hingst's[9] patient lived for five years after palliative surgical procedures.

Halstead[7] is credited with the first resection of a carcinoma of the ampulla of Vater in 1898. Cohen and Colp,[5] in a review of the literature in 1927, collected the reports of 58 cases in which the tumour had been removed, and Hunt and Budd[8] add to these the cases reported between 1927 and 1936, bringing the total up to 76. In 63 of these the operative procedure was transduodenal excision; in 9 cases a resection of the duodenum was performed; and in 4, a retroduodenal excision. The operative mortality was 38.1 per cent, and 37 of the 47 patients who survived the operation were alive at the end of one year. Eleven patients are reported as having lived for various periods from two to twenty-two years after operation. Three additional

cases are reported by Whipple, Parsons and Mullins,[6] with one operative death and one death eight months after operation. As a result of their experience with the first two cases they performed in their third case a two-stage operation which differs from any heretofore used in that it permanently excludes the pancreatic secretion from the intestinal canal. They state that disaster overtakes many operations for ampullary carcinoma because of the presence of the pancreatic secretion, activated by the duodenal contents, at the site of operation. At the first stage, after demonstrating the patency of the cystic duct, they did a posterior gastro-enterostomy, a cholecyst-gastrostomy, and divided between ligatures the common duct a short distance below the point where the cystic duct joins it. At the second stage, a month later, they removed the second part of the duodenum together with part of the head of the pancreas and the distal segment of the common duct. The proximal and distal ends of the duodenum were closed, the pancreatic and accessory pancreatic ducts were ligated, and the cut surfaces of the pancreatic tissue sutured together with silk. Except for drainage of the operative bed they made no provision for the continuance of the pancreatic secretion, relying on the ligation of the ducts to cause an atrophy in the secreting cells, and they state that patients will suffer no serious ill effects from the absence of pancreatic secretion in the digestive tract.

COMMENT

The operation of Whipple, Parsons and Mullins conforms with the general surgical principle of a wide excision for a malignant growth, and it should show results superior to those of any other type of operation heretofore undertaken. Sufficient time, however, has not yet elapsed to demonstrate its results. Since their first operation they have modified the procedure by substituting a cholecyst-jejunostomy for the cholecyst-gastrostomy, on account of the tendency of patients to develop cholangitis when the gall bladder opens into the stomach.[10]

In any operation for the removal of a malignant growth of the ampulla of Vater it is best to divide the work into two stages, providing for a side-tracking of the biliary stream at the first operation, and removing the growth at the second, when the patient is relieved of his cholæmia. In case 2, here reported, in which the operation was done in one stage, the serious hæmorrhages which continued from the 6th to the 12th day would probably have been avoided by a two-stage operation. In doing a transduodenal excision it is important to place snugly-fitting catheters in the open ends of the pancreatic duct and the common duct, and to push the distal ends of these catheters as far as possible down the bowel so that the pancreatic and biliary secretions will be carried away from the site of operation. A "T" tube placed in the main bile duct above the proximal end of its catheter and extended out to a bottle on the floor, so that it will act as a siphon, will not only aid in biliary drainage but will provide an outlet for any back pressure of accumulated secretions in the duodenum at the distal ends of the catheters. In my patient the drainage from this "T" tube averaged twenty ounces per twenty-four hours for the first week after operation.

SUMMARY

1. The region of the ampulla of Vater is the most common site for carcinoma in the small intestine.

2. The symptoms and pathology of ampullary carcinoma are briefly discussed.

3. Two cases of adenocarcinoma of the ampulla of Vater are reported in one of which a palliative operation was performed and in the other a transduodenal excision.

4. A partial review of the literature with respect to the incidence of cancer of the ampullary region and the results of its surgical treatment is presented.

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APPENDICEAL COLIC*

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THE vermiform appendix, morphologically, is the apex of the pouching of the primitive loop. Kelly and Hurdon,[1] and Gladstone and Wakeley,[2] have described a transient appendix, developing at 5 weeks and disappearing at the 7th week. The ordinary appendix is formed somewhat later. The first, however, may persist, in which case there will be two vermiform appendices; or, indeed, if the development of the caput cæcum is full there may be no appendix (Green and Ross[3]). Still another variation is the vermiform appendix being the only representative of the cæcum (Mouchet, Noureddine and Hamza[4]).

The structure of the vermiform appendix is very closely related to the large gut, having long and circular muscle coats, a circular muscle at the proximal end that is thickened and band-like and acts as a sphincter. There are well-marked masses of lymphoid tissue below the muscle; the mucous membrane contains mucous glands and has ordinary crypts.

The cæcum, ileum and appendix are normally covered with peritoneum in such a way that there is mobility by virtue of a mesentery of a sufficient length to furnish it. This mesentery carries the vessels to the part, and each side of it is sheathed or closely invested with peritoneum. The vermiform appendix in the usual case is without a mesentery over its distal half, this part being entirely surrounded by peritoneum and perfectly mobile except for its attachment to the proximal half of the appendix. Variations in the arrangement of the peritoneal cover of the appendix cause a reduction of movement and fixation that may readily effect the size of the lumen. It is common to find the appendix wholly or in part behind the cæcum against the abdominal wall and quite extraperitoneal and fixed in position. Again, it is common to find an asymmetry of the lateral leaves of the peritoneal investment of the appendix. One side may be short and as a consequence rotate the appendix in one direction and fix it there, so that there is a consequent diminution in the actual diameter of the lumen. Several varieties of these anomalies of the peritoneal investment may be found. The peritoneal folds producing these deformities and fixations are fine avascular sheaths that may be divided without any harm to the vessels of the mesentery, and when the folds or veils are divided the appendix will assume a more normal position and its size will become uniform with the distal or free portion. A Lane's kink is a somewhat similar deformity produced in the terminal ileum by an abnormal peritoneal arrangement. In 361 cases operated upon, where a close study was made of the peritoneal arrangement, definite and gross anomalies were present in 242 cases.

The vermiform appendix has in general the same physiological functions as the large gut. It concentrates the intestinal contents. Water is absorbed and a residue is left. Peristalsis is present and the mucous membrane secretes mucus. A normally functioning appendix has liquid content flow into it, water is absorbed, and peristalsis evacuates the content and is timed with the peristalsis of the large gut. If, however, there is any obstruction to the evacuation of the residue, such as a swelling of a lymph mass, a hyperactive sphincter, or an extraneous band, then the lumen may be so narrowed that abnormal peristalsis may be required to discharge the contents into the cæcum. If the residue remains in the appendix it continues to lose water and becomes a dry fusiform mass, so shaped by being pushed along the lumen to the point of obstruction. This then is a disturbance of function directly attributable to an anatomical cause. The increased peristalsis working against obstruction causes pain, and the pain is referred frequently to the epigastrium. The pain is produced by peristalsis, and anything initiating peristalsis in the intestines also initiates it in the vermiform appendix. A patient had an appendicotomy done for lavage of the large intestine. The tip of the

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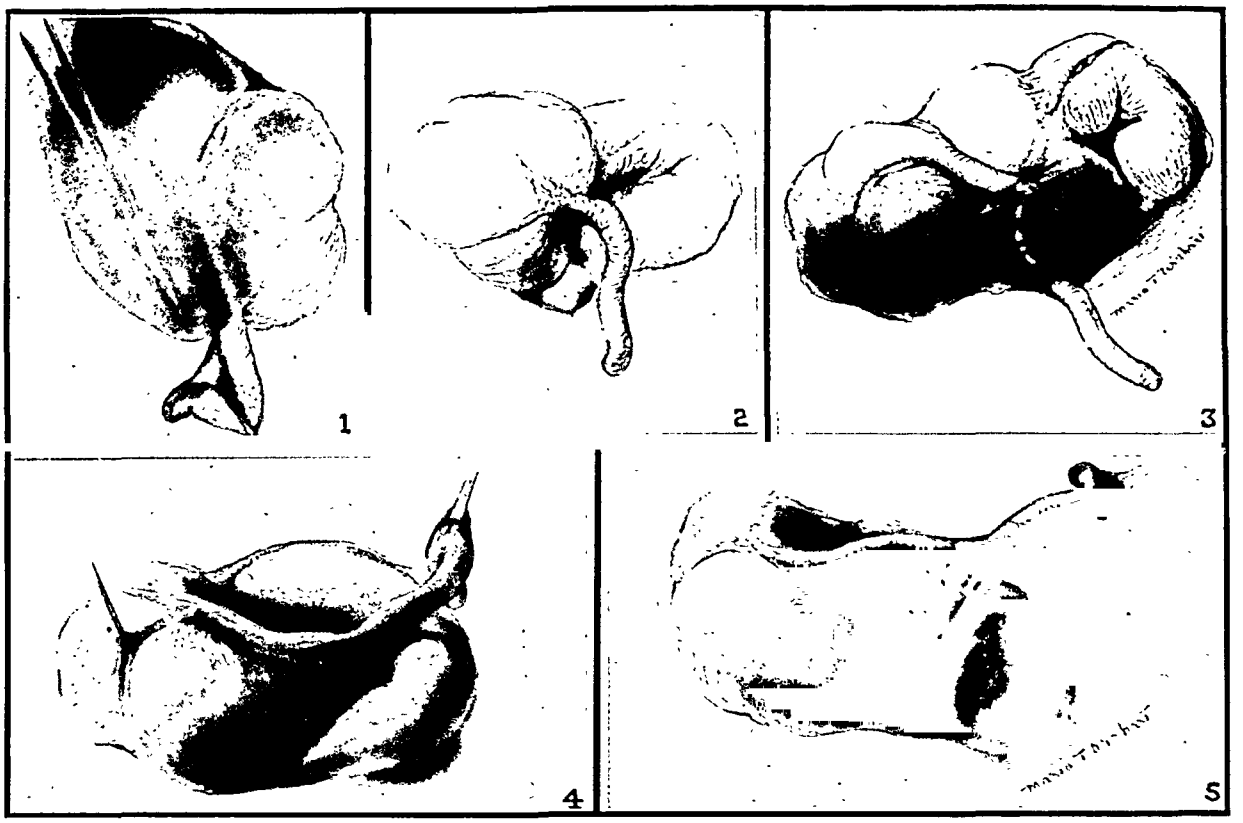


Fig. 1.—Membrane binding base of appendix to cæcum. (J.M., S.199.33, age 12.) Fig. 2.—Appendix kinked by membrane carried off cæcum on to appendix. (R.W., S.18.33, age 7.) Fig. 3.—Appendix bound to cæcum; free at proximal and distal ends. (E.G., S.766.33, age 6.) These three drawings illustrate variations in peritoneal abnormalities that immobilize the appendix in its proximal half.

Figs. 4 and 5.—The lateral fold of peritoneum rotating the appendix outwards in its proximal half. Division of this fold releases the rotary twist.

appendix having been brought through the abdominal wall was allowed to unite there. When the wound would permit of it and the cooperation of the patient was obtained the tip was pinched and the patient complained of pain around the umbilicus and in the epigastrium, which is the region for referred pain from the ileum, cæcum and appendix. If the appendix were pinched severely for five or ten seconds she would complain, in addition to pain, of nausea and a desire to vomit. This feeling disappeared immediately on cessation of the pinching. Later, when the appendix was opened and lavage carried out, the too rapid entry of fluid into the lumen of the appendix caused nausea and pain, and, if the pressure were not relieved, vomiting. The symptoms associated with appendiceal colic, therefore, arise from obstruction. Whether or not this obstruction is transient or permanent depends upon the strength of the peristalsis and the passage of the material that is to be forced through the narrow opening. If the peristalsis is successful in emptying the appendix of its content, be it gaseous or semi-solid, then abnormal peristalsis ceases and pain disappears. But if the obstructed content is held against the narrowed lumen until there is a change in the mucous membrane then one has a closed loop intestinal obstruction developing distal to the narrowing, and with pathological changes supervening and involving the muscle peristalsis ceases and an abscess develops in the obstructed appendix. Appendicitis exists only with the beginning of pathological change which is primary in the mucous membrane as a result of the obstructed loop. A narrowing of the lumen of the appendix may cause an intermittent obstruction over a period of years, and during the time of this intermittent obstruction peristalsis is increased, including peristalsis of the large bowel, and pain is experienced, diffuse in character, at the level or above the level of the umbilicus. These attacks of pain pass off with the evacuation or relief of obstruction in the appendix and leave no pathological change in any of the tissues of the appendix.

(Moving pictures were shown to demonstrate the freeing of restrictions in three or four cases.

A Lane's kink was also demonstrated in one case with involvement of the appendix.)

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APPENDICEAL COLIC*

BY ALAN BROWN

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DURING a ten-year period (1922-1933) at the Hospital for Sick Children there were 1,264 cases of appendicitis. Of this group 51.3 per cent were clean cases and 48.7 per cent were ruptured. The total mortality among the ruptured cases was 11.24 per cent. In Toronto during a five-year period (Dr. J. L. McDonald) there has been an average of 100 deaths each year from appendicitis, or 16.3 per 100,000 population. In Ontario during a similar period there was an average of 438 deaths each year from this cause, or 13.2 per 100,000 of population. In the United States 18,100 deaths were reported from this cause in 1930, or 15.3 per 100.000 population. "Why, with improvement in public health methods and better facilities for preventive medicine, have we this high death rate? Undoubtedly the medical profession is to blame. Until the beginning of the century an operation for appendicitis was a comparatively rare event. It became gradually more popular, until it became quite the vogue to have one's appendix out, and any patient who complained of a pain in the abdomen was subjected to an appendectomy with little regard for the condition present. As many of these patients came back still complaining of symptoms, the operation became less popular. The pendulum swung to the other extreme, many surgeons refusing to operate on any except those suffering from a fulminating attack. From this time till the present a great deal of water has flowed under the bridge, and we have progressed in our methods of differential diagnosis. We now have a more perfect understanding of the condition and are not subjecting our patients to operation until they have been carefully examined, but at the same time we realize that the condition may be recognized in its most incipient stage."[2] As evidence of this latter statement let me say that during the past few years a little over 600 private patients have been operated upon for the mechanical appendix by Dr. D. E. Robertson and his staff without a single death, which speaks well for modern surgery.

Our thanks are due to the surgical staff of our hospital for carefully analyzing their mortality statistics and pointing out that 90 per cent of acute appendices rupture in children under five years, with a death rate of 24 per cent, and, further, on careful inquiry into these cases it was almost invariably found that there had been some previous significant history which would have assisted in an earlier diagnosis. The main points then brought out by this study were: (1) that appendicitis was a disease of all ages; (2) that in children the attacks frequently commenced with mild symptoms and were prone to recur; (3) that once the appendix had ruptured an inevitable mortality must be expected. And I might add a fourth myself, and state that in no textbook published today is there recognized a description of the mechanical appendix.

A typical history is that of a child who has had short attacks of recurrent abdominal pain for an extended period of time, either at daily, weekly, monthly, or even longer intervals. The pain varies from a dull ache, a burning sensation, or a sense of fullness, to one of a sharp, stabbing character. The attacks may be very fleeting, but they have a marked tendency to recur, and at times nausea and even vomiting may be associated. The recurrence of attacks in spite of a well regulated diet and good hygiene is of most important diagnostic significance. Children frequently stop in their play, turn a little white, have a slight generalized

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abdominal pain, which almost instantly ceases. These are the cases which are usually, but incorrectly, diagnosed as indigestion. The pain may come on during or from one-half to two hours or so following a meal, or the pains may have no relation whatsoever to meals. Not infrequently the child takes only a few mouthfuls of food and says that he "is full". Not infrequently, if in the case of a boy, the parent will notice him loosening his belt, or in the case of a girl she complains that "her dress band is too tight". These are all most significant symptoms and if not especially inquired for will frequently not be mentioned. Pain is usually brought out by exercise. Its location at first is usually epigastric or umbilical, only later on does it occur at the usual site. A bowel movement, passage of gas, or vomiting, may give prompt relief for the time being. With these symptoms poor colour, poor muscle tone, poor nutrition, and defective posture are often associated.

A careful abdominal examination either at the time of actual pain or in the interval will reveal a definite point of tenderness around the navel, often causing the child to complain of epigastric pain. There is no muscle rigidity. It is most essential to obtain the child's confidence and gently palpate the whole abdomen, watching the facial expression and the legs for any movement indicative of pain. When the tender spot is touched the leg or legs will become flexed and the facial expression indicative of discomfort. The temperature, pulse, respiration and blood count are normal. A roentgen-ray examination is quite useless.

A second type is that found in a child who has been in apparently good health, but is usually of poor nutrition. He goes to bed, to awake several hours later with sharp abdominal pain which causes him to double up. The pain is soon relieved, and he sleeps again, only to awaken a second time with a return of colic, and he frequently vomits. At first the pain is in the umbilical region, acute and spasmodic; later, it becomes less acute but more continuous, and becomes localized in the right lower quadrant. The temperature, pulse, respiration and blood are normal, but there is frequently an anxious expression. These attacks of colic may have numerous remissions.

There is a third type of mild acute appendicitis, probably embolic, secondary to an infection from tonsillitis, colds, sinusitis, etc. The patient has malaise, nausea, a coated tongue, loss of appetite, and constipation, with a slight temperature. There is a vague abdominal pain at the umbilicus which later becomes more or less localized to the right side. The patient may be in bed for a day or two, at the end of which time the symptoms gradually clear up. Deep iliac tenderness can be obtained, and if an operation is performed œdema of the appendiceal wall is found. It is often these overlooked attacks which cause inflammatory reaction with subsequent fibrotic stricture of the appendix.

There are numerous other combinations of symptoms neither so definite nor so suggestive of chronic appendicitis but equally important to the child. A child who on automobile trips has nausea, or actively vomits, or who has had periodic attacks of vomiting, either repeated mild attacks often in the morning before breakfast or severe ones with associated acidosis, probably has a mechanically obstructed appendix. He may, however, never have had any abdominal pain. An examination of the abdomen at the time frequently discovers deep iliac tenderness and, less often, rigidity. These patients are treated as a rule for an imbalance of the sympathetic nervous system, causing reflex vomiting and spasticity of the colon, resulting in colicky pains and constipation.

It is necessary to proceed with extreme caution and observe these patients for some time and to rule out any involvement of the genito-urinary tract, but when by a process of elimination focal infections are excluded one is justified in making a diagnosis of mechanical lesions in or around the appendix. Diagnoses are largely based on a history of long-continued symptoms and by elimination rather than by actual physical findings.

DIFFERENTIAL DIAGNOSIS

It is impossible at this juncture to discuss all the conditions in children in which abdominal pain may be a symptom, and so I shall only mention those that should be given careful consideration in differentiation from the mechanical appendix. In order of importance they are as follows.

Indigestion and constipation. — This class probably comprises the largest group of all children complaining of abdominal pain. Chil-

dren who eat improper food, particularly that rich in fat, or who persistently bolt their meals, are constipated, and generally break the rules of hygiene, consistently complain of abdominal pain. Another factor is fatigue. It is particularly difficult in our present high pressure method of living to get a child to take sufficient rest. These cases may be corrected with diet overcoming constipation and giving adequate rest.

Recurring throat infection.—There are many patients who consult the physician with the complaint of repeated abdominal pain associated with fever and a sore throat, followed by signs of a head cold. In many of these the pain is due to lowered food tolerance consequent to the infection. At the same time there may occur embolic involvement of the mesenteric glands producing general abdominal tenderness, and, as previously mentioned, embolic involvement of the appendiceal wall.

In 40 cases of persistent pyuria only 5 gave a history of recurring abdominal pain, and 2 complained of pain over the bladder; in 82 cases of acute pyuria 15 gave a history of pain in the abdomen; in 20 cases of kidney stone 6 gave a history of abdominal pain. In all such cases investigation of the genito-urinary tract will clear up the diagnosis.

Gastro-intestinal allergy.—This is not an infrequent cause of abdominal pain accompanied by soreness and either diarrhœa, constipation or vomiting. The symptoms are due to œdema of the mucous membrane and spasm of the smooth muscle which produce disturbances of function. This condition should be taken into consideration if the child shows other manifestations of allergy or belongs to an allergic family.

Psychic causes.—Many children complain of abdominal pain as a defence reaction to escape eating meals, to focus attention upon themselves or to avoid doing things that may be distasteful.

Worms.—In 5 cases of tape worm 2 gave a history of pain in the abdomen; one complained of slight pain on and off during the habitation of the worm, and the other had severe abdominal pain each time segments were passed. It is doubtful if pin-worms cause any abdominal discomfort, and then only if they are within the appendix, which event occurs in about 10 per cent of appendices operated on.

CONCLUSIONS

1. Any disease which has such a high death rate merits careful consideration.

2. When in doubt about an appendix in a child take it out.

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VENEREAL DISEASE IN RELATION TO PREGNANCY*

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VENEREAL disease in pregnancy frequently presents a very practical problem to the general practitioner. This paper is written in the hope that it will prove of service and stimulate further interest in one very important phase of venereal disease control. Whereas the paper is essentially a review, a number of suggestions are included for the practical management of venereal disease in pregnancy and the prevention of disease in the newborn. In view of the present active American campaign against venereal diseases, notably syphilis, a review of the subject of this paper would appear to be definitely in order, more especially as little in this regard has appeared in Canadian literature of the past five years.

It has been only as a result of education and intelligent cooperation of the laity, the organization of special clinics and other facilities for treatment, modern methods of investigation, and improved methods of therapy, that venereal disease now does not possess the same relative prominence it did only a short two or three

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decades ago. Even within the past few years the medical viewpoint has changed remarkably regarding the advisability of prenatal antiluetic treatment—former therapy was inadequate (in the light of modern ideas) or was deferred entirely until after childbirth, consequently with a much higher incidence of congenital syphilis.

The association observed between venereal disease and all phases of the reproductive function makes the former a clinical subject of major obstetrical and gynæcological significance. Early investigation, diagnosis and treatment are of extreme importance if a pregnancy is to continue safely and terminate in the birth of a healthy infant. In the light of modern treatment such tragedies as the stillbirth of syphilis, the congenital syphilitic, the blindness of ophthalmia neonatorum, are almost entirely preventable, but their prevention demands unfailing prenatal watchfulness on the part of each physician.

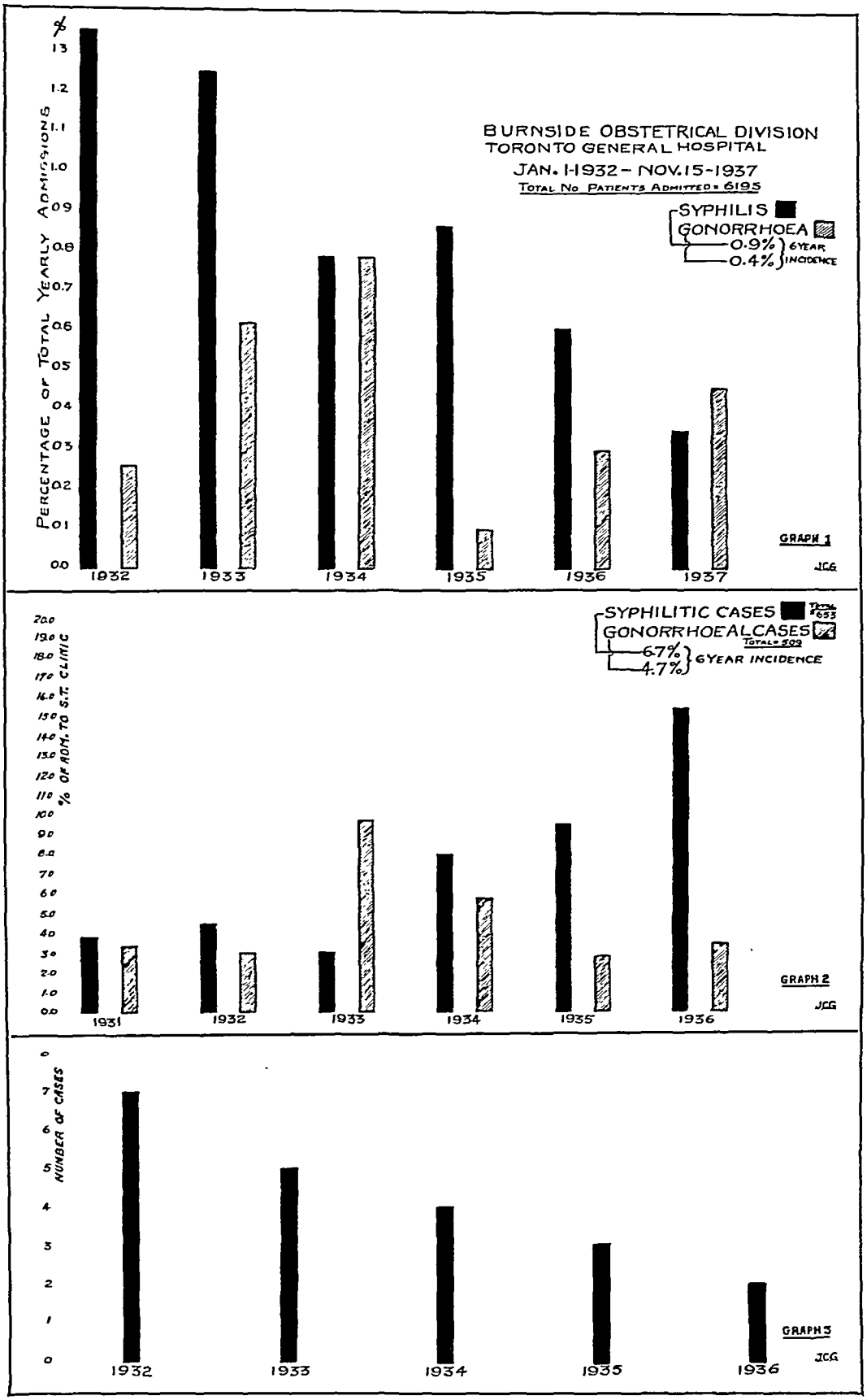
In this paper the discussion will be limited to syphilis and gonorrhœa in relation to pregnancy. Infection producing the chancroid lesion (due to the bacillus of Ducrey) is rarely seen in conjunction with pregnancy. The records of the Special Treatment Clinic during the last six years do not contain a single reference to pregnancy complicated by this type of venereal disease, and this has been a matter in accordance with my own observation elsewhere.

SYPHILIS IN RELATION TO PREGNANCY

According to a calculation by Holland[1] stillbirths due to syphilis approximate 4,000 per year in England and Wales. While such a state of affairs, if we consider it in its world-wide aspect, undoubtedly possesses a certain economic advantage in population control, yet from the purely obstetrical viewpoint it strikes us as a challenge. Surely better methods of control of population exist. Where miscarriages and stillbirths result from syphilis, children with congenital syphilis will also result, and in addition the maiming effects of syphilis may be observed in the parents. The economic disadvantage of thousands of such syphilitic families surely is greater than that of the additional population which would result from the absence of syphilis. Further, one has to face the uncertainty as to where the disease may be found even among intelligent expectant mothers. Syphilis is most frequently contracted from their husbands, who have come in contact with the multiple existing sources of infection. Were it not for the assistance of routine prenatal Wassermann and Kahn tests, combined with constant clinical watchfulness, the majority of these innocently infected mothers might pass unnoticed, even in spite of stillbirths, until the disease finally became apparent in the birth of a child showing congenital syphilis. The simple prenatal inclusion of the serological test for syphilis is necessary, even though the incidence of syphilis among our Canadian obstetrical patients is low. It will be kept low only by reason of our individual efforts.

The frequency of syphilis in pregnancy.—The frequency of pregnancy complicated by syphilis depends largely upon the class of patients with which one has to deal, and it varies in different parts of the world. A series reported by Ricord[2] in Paris gives an incidence of 1 syphilitic in 8 pregnant women. McCord[3] in 1926 reported incidences of from 7.5 to 22.5 per cent among series of pregnant negro women in the United States. More recent reports among the white population of the United States tend to show a much lower incidence. Based on serological tests the majority of series reported in recent literature give a figure of less than 5 per cent. Plass[4] states that the percentage of syphilis is greater in multiparæ than in primiparæ. He further points out the tendency toward a lower incidence of syphilis among private patients, and quotes a series with an incidence of approximately 1 per cent positive Wassermann reactions.

The frequency of syphilis among public ward obstetrical patients at the Toronto General Hospital is shown in Graph 1. The average incidence over approximately a six-year period is slightly less than 1 per cent, and it is interesting to note how the rate has dropped since 1932. This also is shown in Table I. At the Special Treatment Clinic of the Toronto General Hospital the incidence of syphilis associated with pregnancy, from 1931 to 1936 inclusive, is shown in Graph 2, with an average six-year incidence of 6.7 per cent. An increase in the proportion of pregnant syphilitic patients is observed in the years 1934 to 1936 inclusive, although Table II shows a decrease in the total number of



Graph 1.—Incidence of syphilis and gonorrhœa in public ward obstetrical cases. **Graph 2.**—Incidence of venereal disease in association with pregnancy, in out-patients' special treatment clinic, Toronto General Hospital. **Graph 3.**—Incidence of gonorrhœal (neonatal) ophthalmia in-patient cases, Hospital for Sick Children, Toronto, January 1, 1932 to December 31, 1936.

patients treated over this period. These patients varied from two to eight months' gestation on admission to the clinic for treatment.

Clinical aspects.—Syphilis tends to be a milder disease in women than in men, with the primary lesion often passing unnoticed according to Plass[4] and Moore.[5] The secondary lesions

TABLE I.

INCIDENCE OF VENEREAL DISEASE IN PUBLIC WARD OBSTETRICAL CASES

Year	*Total admissions to Burnside*	*Syphilitic cases*	*Gonorrhœal cases*
1932	1,170	16	3
1933	1,128	14	7
1934	1,015	8	8
1935	1,037	9	1
1936	985	6	3
1937	860	3	4
Totals	6,195	56	26

TABLE II.

INCIDENCE OF SYPHILIS AND GONORRHŒA ASSOCIATED WITH PREGNANCY AT OUTPATIENT DEPARTMENT SPECIAL TREATMENT CLINIC.

Year	*Total admissions to clinic*	*Number of pregnant patients*
	A. Syphilis	
1931	131	5
1932	133	6
1933	117	4
1934	99	8
1935	95	9
1936	78	12
Totals	653	44
	B. Gonorrhœa	
1931	87	3
1932	134	4
1933	91	9
1934	69	4
1935	71	2
1936	57	2
Totals	509	24

may be forgotten or ignored. This mild picture is more frequently the case where syphilis is acquired about the time of conception than where the infection occurs later in the pregnancy.

There is considerable unanimity of opinion that an accurate history of syphilis is almost impossible to obtain in the majority of obstetrical patients. In a moderately large series reported by Nathanson[12] syphilis could not be diagnosed in over 80 per cent of cases on the basis of the history and physical findings alone. The routine Wassermann reaction, confirmed by the Kahn test to avoid error, stands out as the best diagnostic procedure, and should form an integral part of every prenatal routine. Although McCord[6] states that pregnancy does not affect the reliability of the Wassermann reaction it is advisable to repeat the test where a positive test is given and also where syphilis is suspected in spite of a negative report.

Syphilis in general does not materially affect labour or the puerperium. Occasionally inertia is observed in labour; lacerations in the birth canal tend to be deeper in the presence of luetic lesions, and often heal slowly. There is an increased tendency toward puerperal sepsis, due to lowered general resistance to bacterial infection, or from secondarily infected genital lesions.

The effect of syphilis upon the fetus.—It is known that the effect of syphilis upon the fetus tends to be mitigated with subsequent pregnancies in the syphilitic mother. Miscarriage due to syphilis is apt to be followed by the birth of a premature macerated fetus, then by stillbirth at or near term, then by a living child with congenital syphilis, and then by later children presenting milder degrees of luetic infection. The transmission of syphilis to the fetus from the mother is always through the placenta; any other mode of infection is extremely improbable and need not be considered here. According to Adair[11] the effect of syphilis in producing abortions has been overestimated. It is believed that interference with the nutrition of the embryo by reason of placental syphilitic disease does not occur before the 16th week, as spirochætes have never been demonstrated in either the fetus or placenta of less than 16 to 18 weeks. After this period of intrauterine life, however, maternal syphilis jeopardizes the existence of the fetus with the production of placental syphilis and this is responsible for fetal death *in utero*. The essential feature of the syphilitic placenta is an endarteritis of the vessels of the chorionic villi. This leads to progressive decrease in fetal nutrition. In the case of stillbirth where syphilis is suspected the placenta should be subjected to histological examination for evidence of syphilitic disease. A positive Wassermann reaction, confirmed by the Kahn test, at the present time, according to most authorities, offers reliable evidence as to maternal syphilis, and one may justifiably use it as a diagnostic basis for anti-syphilitic treatment.

Even if the treatment is begun late in pregnancy evidence exists[4] that the syphilitic placental changes may improve sufficiently to permit the birth of a living child. Eastman[12] states that the placenta stores salvarsan for secondary supply to the fetus according to its needs.

As a general rule it may be said that the child of a syphilitic mother will be syphilitic, although Fildes[13] states that maternal syphilis does not always mean fetal infection. Conversely, the mother of a syphilitic child is always syphilitic. Surveys show that a small percentage of healthy children may be born of syphilitic mothers, even though the latter be untreated. This remote possibility might occur where the mother became infected late in pregnancy, but there always exists a further possibility that the apparently healthy newborn child might later present evidence of syphilis. Boas and Gammeltoft, quoted by Plass,[4] state that untreated syphilitic mothers with strongly positive Wassermann reactions give birth to a very high percentage of syphilitic infants (96.5), and this finding is confirmed in the main by other observers. According to McCord[6] and others the x-ray finding of osteochondritis of the long bones is pathognomonic of congenital syphilis, and almost invariably will be present even in the absence of other clinical evidence of the disease.

Comments as to treatment.—In view of the possibility of latent syphilis it is advisable to give treatment during pregnancy in cases giving a history of antiluetic treatment, even where the Wassermann test is negative, and irrespective of the absence of symptoms. McCord[6] states that, regardless of the activity of the disease, whether latent or actively progressive, sufficient prenatal anti-syphilitic treatment will assure a woman a syphilis-free child in 95 per cent of the cases. This opinion is confirmed by others such as Nabarro, Harrison, Anwyl-Davies.[1] Cole *et al.*[7] state that congenital syphilis and other syphilitic manifestations, such as miscarriage and stillbirth, are preventable, but *their prevention is dependent upon early diagnosis by routine prenatal serological tests and adequate early treatment.*

According to a number of observers[4, 5, 6, 7] the pregnant woman tolerates anti-syphilitic treatment as well as or better than the non-pregnant. Every case should be treated even if discovered late in pregnancy. Even admittedly inadequate treatment given late in pregnancy has been reported as showing surprisingly beneficial results in the offspring.[4] Observers have noted that a partial or a single series of an intravenous arsenical has occasionally been followed by a permanently negative Wassermann reaction. Where, under close prenatal supervision, adequate treatment is begun early in pregnancy, in the absence of toxic manifestations due to treatment or other complications of pregnancy, the degree of fetal protection against syphilis is almost absolute. Further, no disturbance of labour or the puerperium has been observed as a direct result of prenatal anti-syphilitic treatment.

The carefully supervised administration of modern arsenical preparations in combination with a heavy metal such as bismuth is regarded by the majority of observers as a safe procedure in pregnancy. Arsenical overdosage in pregnancy, however, has been reported by Cormia[8] and by Plass and Woods[10] as responsible for hæmorrhagic encephalitis—a serious and usually fatal manifestation clinically resembling eclamptic toxæmia. McKelvey and Turner[9] however, report 1,000 cases of syphilis in pregnancy treated with moderate dosage of arsenic with no serious toxic disturbance. Plass and Woods[10] stress close observation in giving the first course of treatment in the latter months of pregnancy, because of possible toxic disturbances.

A Routine of Treatment of Syphilis in Pregnancy at the Special Treatment Clinic, Toronto General Hospital

This plan of treatment follows the Harrison routine, though modified to give a somewhat smaller arsenical dosage over a longer period. Treatment is begun as soon as the disease is diagnosed, and always if possible before the fifth month of pregnancy. Even if the patient does not report until late in pregnancy treatment is given until full term. Treatment is continued to full term even though the Wassermann and Kahn tests become negative. Patients having been treated prior to the advent of pregnancy are subjected to further treatment during pregnancy, regardless of negative Wassermann and Kahn tests. Each patient is treated in collaboration with the prenatal clinic or with her own physician if confinement is to

take place at her own home. She is instructed to return to the clinic following confinement for further observation and treatment. Through the social service department arrangements are made for the children born of these mothers to be investigated, and, where necessary, treated by the Special Treatment Clinic of the Hospital for Sick Children or by their own physician.

I. *The early case.*—By "early" is meant primary, the sero-positive primary, and the secondary luetic case. This group will usually include those cases in which infection occurs at or about the time of conception. The same plan is also followed for the early case appearing any time later in pregnancy. The treatment is as follows—(*a*) Novarsan (0.45 to 0.6 g. depending on the patient's weight) is injected intravenously; and (*b*) 2 grains of bismuth oxychloride is injected intramuscularly (hip). This combined dosage is given every 5 days for five treatments. Following this the novarsan and bismuth oxychloride in the same doses are given at weekly intervals for 10 to 12 weeks. Then the novarsan is discontinued and the bismuth oxychloride continued for a further period of 6 weeks. Then the novarsan and the bismuth oxychloride are again resumed for 10 to 12 weeks. Again, as before, the novarsan is discontinued, and the bismuth oxychloride continued, and so on with this alternation until full term is reached, endeavouring if possible to end the prenatal treatment with the arsenical plus bismuth and not with the bismuth alone.

2. *The late case.*—By this is meant the latent, or the tertiary case. Usually the only evidence of latent syphilis is the positive Wassermann and positive Kahn reactions. Essentially the same form of treatment is followed, but at weekly intervals without the initial 5 treatments at five-day intervals. In the tertiary case saturated solution of potassium iodide in 10 minim doses, t.i.d., is given as in the Harrison routine in conjunction with the administration of novarsan and bismuth oxychloride.

Treatment is discontinued (pending further investigation), either temporarily or completely, on the advent of toxic manifestations such as the following: prolonged nausea or persistent vomiting, for more than 24 hours; jaundice; albuminuria, or other evidence of renal damage; dermatitis; pre-eclamptic or eclamptic toxæmia. For the most part, however, this routine has been well tolerated by pregnant patients and has been associated with no serious toxic complications.

GONORRHŒA IN RELATION TO PREGNANCY

Gonorrhœal infection in pregnancy is a common occurrence, and the incidence, as with syphilitic infection, varies in different areas of the world and in different classes of society. Neisser at one time stated that male and female gonorrhœal infection possessed an incidence only secondary to that of measles. At the present time the relative incidence in proportion to population has shown a distinct decrease as a result of education, venereal disease control measures, and more satisfactory methods of treatment.

The frequency of gonorrhœa in pregnancy.—The frequency of the disease in relation to pregnancy, according to European writers, varies from 1.5 to 50 per cent. American series show a generally lower incidence of infection, averaging from 5 to 10 per cent of pregnant patients. Bernstine and Castallo[14] give an incidence of 7 per cent among outpatients attending the prenatal clinic of the Jefferson Medical College Hospital; and Bernstine[17] gives an incidence in delivered ward cases of 5.4 per cent. Schumann[14] is quoted as being of the opinion that an incidence of 2 per cent is more nearly correct for the present frequency among all classes of society.

The incidence of gonorrhœa among public ward patients of the Burnside Obstetrical Division of the Toronto General Hospital over approximately a six-year period (January 1, 1932 to November 15, 1937) is shown in Graph 1 and Table I, the average incidence being less than 0.4 per cent. In Graph 2 and Table II is shown the frequency of pregnant patients attending the Outpatient Special Treatment Clinic for the treatment of gonorrhœa from 1931 to 1936 (inclusive), an average incidence over a six-year period of 4. 7 per cent. The incidence in the Burnside obstetrical series is lower than in other reported series, being slightly under 1 per cent at its maximum for any one year. The proportion of pregnant patients with gonorrhœa attending the Special Treatment Clinic of the Toronto General Hospital is comparable with that of pregnant patients with syphilis, in both

instances the average six-year incidence being about 5 per cent.

Clinical features.—Chronic gonorrhœa may be present in pregnancy with little or no clinical evidence, becoming apparent only with the occurrence of ophthalmia neonatorum or with the post-partum manifestation of acute salpingitis or arthritis. Not infrequently the chronic infection is activated by pregnancy, which state produces a more fertile field for the growth of the gonococcus, due to increase in pelvic vascularity and in glandular secretions. Acute and subacute infections in pregnancy usually present intensified clinical evidence for the same reason. Bernstine[17] has shown that *Trichomonas vaginalis* infestation is not an infrequent associate of the gonococcus. He found that 18 per cent of the patients presenting *Trichomonas vaginalis* infestation in pregnancy also had gonorrhœa. The two conditions thus may be confused. A case clinically diagnosed as gonorrhœa, which shows considerable resistance to treatment, may have *Trichomonas vaginalis* infestation as well, or the clinical picture may be due entirely to the latter.

The chronic case of gonorrhœa presents the greatest potential danger, as it may pass unrecognized. The trivial amount of discharge noticed by the patient is often completely ignored. The patient with the acute disease usually reports to the clinic or to her own physician for treatment, though here again patients have a tendency to explain any vaginal discharge to their own satisfaction. If the condition does not greatly inconvenience them they resort to frequent douching until the discomfort has passed, and then proceed to ignore it. The majority of intelligent women, however, will report a persistent or irritating vaginal discharge, and on learning its cause will cooperate until cured. The greater number of the cases of pregnancy complicated by gonorrhœa coming to the clinic presented evidence of the chronic stage of the disease, the acute form being less common. Patients with infections occurring in the course of pregnancy commonly report the source as their husbands, and not infrequently the latter were supposed to be cured.

The search for evidence of gonorrhœa should be an integral part of every prenatal routine. Occasionally the diagnosis of a chronic case may be difficult, necessitating the examination of several smears. The method of bacteriological culture of the gonococcus represents a valuable diagnostic aid, and has been constantly employed in this clinic for over a year with a remarkable minimum of error. It is used initially to determine a positive diagnosis, and, when the clinical picture has improved, is also useful as an indication of cure.

The results of gonorrhœal infection in relation to pregnancy.—Gonorrhœal infections in women have far-reaching effects. The disease until recent times has been given credit for the production of approximately 40 per cent of the sterility in women, and has been held responsible for nearly one-half of all gynæcological operations. Marshall[15] states that gonorrhœal ophthalmia accounts for approximately 20 per cent of all blindness observed in state institutions.

The influence of gonorrhœa upon pregnancy, labour, and the puerperium.—Abortion, miscarriage and premature birth are very unlikely complications of gonorrhœa, and, when occurring, are more likely due to ill-advised or carelessly conducted treatment than to the infection itself, even though acute. The only abortion noted in the past six years at the special treatment (gonorrhœal) clinic of the Toronto General Hospital, followed cauterization of the lower cervical canal in a case in which early pregnancy had not been diagnosed.

As a result of the softening influence of frequent baths and the daily warm antiseptic douches advised during treatment of gonorrhœal infection in pregnancy the dilation of the cervix tends to occur more quickly, and the second stage of labour may be shortened. There is always the possibility of puerperal pelvic infection (acute salpingitis) in gonorrhœal cases as a result of upward extension from the cervical focus. This danger is obviously increased if manual or instrumental interference has been associated with delivery. For the same reason third-stage uterine manipulation also should be avoided.[19] The only instance of post-partum gonorrhœal extension to the pelvis in the Burnside obstetrical series (whose incidence has been shown in Graph 1), was a non-clinic case of acute bilateral salpingitis where gonorrhœa was not recognized or treated prenatally. Three-fourths of the cases in this series in which gonorrhœa had been diagnosed prenatally had received treatment either at the special treatment clinic or through their own physicians.

Ophthalmia neonatorum.—May[2] pointed out that ophthalmia neonatorum, twenty-five years ago, was the cause of 30 per cent of the total blindness; and by 1924 it still could be regarded as the etiological factor in about 10 per cent. The blindness in these cases is theoretically preventable. Notwithstanding the fact that the Credé technique (immediate neonatal instillation of 1 per cent silver nitrate) has been almost generally used in the prophylaxis of ophthalmia neonatorum, various writers, such as Marshall,[15] have pointed out that there has been no appreciable decrease in this serious complication of childbirth in the past fifteen years. This may be due to (1) carelessness in the use of the Credé technique; (2) difficulty in delivery, with excessive or prolonged contact of the child's face against the cervix and lower genital tract; (3) early rupture of the membranes. (In this connection it has been stated that the incidence of ophthalmia is less where the membranes remain intact until just before delivery); and (4) possible infection following delivery.

There is little danger to other obstetrical patients from an unisolated gonorrhœal case where the modern routine postpartum nursing care is followed. One, however, cannot stress too highly the possibility of neonatal eye infection from infected mothers and the danger of spread from one infant with ophthalmia neonatorum to others in the same nursery. In the latter instance absolute isolation is of paramount importance.

DeLee[21] believes that the proper use of the Credé technique would reduce the incidence of ophthalmia neonatorum below 1 per cent. The small number of ophthalmia neonatorum cases, 21 in all, admitted to the infant ward of the Hospital for Sick Children, Toronto, from 1932 to 1936 inclusive (as shown in Graph 3), would tend to show that this condition is decreasing in frequency—the hospital admission rate being fairly constant over this period. Marshall[15] states that where gonorrhœa in the mother is treated prenatally, ophthalmia neonatorum may be reduced to one-fifth of that seen in a series where no treatment is given prior to delivery. Bernstine and Castallo[14] present 84 treated gonorrhœal cases in a series of 3,586 obstetrical patients with no ophthalmia neonatorum. There were in this same series of obstetrical patients 15 cases of ophthalmia neonatorum which occurred where the mother's disease had not been recognized or treated, and, further, in spite of routine Credé prophylaxis. Prenatal gonorrhœal treatment for this reason is a very important factor in the prevention of ophthalmia neonatorum.

Carefully conducted prenatal treatment, even if a cure does not result by the time of delivery, in all likelihood will sufficiently mitigate the infection to render Credé prophylaxis effective. Further, it will reduce the danger of the postpartum spread of gonorrhœal infection to the pelvis and will aid in making the disease more amenable to later treatment. Among 26 Burnside obstetrical patients (Table I), whose prenatal condition was complicated by gonorrhœa, 2 cases of ophthalmia neonatorum occurred. In both instances the mother's disease had not been recognized or treated. Thus in 24 out of the 26 cases the Credé technique was an important factor in the prevention of ophthalmia, though approximately 75 per cent of these patients were treated for gonorrhœa by the Special Treatment Clinic or by their own physicians.

ROUTINE OF PRENATAL TREATMENT OF GONORRHŒA, SPECIAL TREATMENT CLINIC, TORONTO GENERAL HOSPITAL

All patients on admission and on discharge from this clinic are subjected to Wassermann and Kahn tests because of the possibility of associated syphilis. The diagnosis of gonorrhœa is confirmed by bacteriological culture, swabs being taken from the urethra and cervix. The husband of an infected patient, whether he is infected or not, is kept under treatment or observation until both patient and husband are free from infection. Likewise, the non-infected pregnant patient is kept under observation as a possible contact if the husband is infected until the latter is cured. Sexual intercourse is prohibited until both patient and husband are free from infection. Alcohol and highly seasoned foods are not allowed. Fluids are forced throughout the period of treatment. This plan of treatment is followed progressively through each stage of the disease; and the patient on admission to clinic is placed on that part of the routine applicable to the stage of her disease.

Acute.—Rest in bed for 7 to 10 days. Urinary sedative if dysuria exists. The external genitalia are kept as free from discharge as possible by use of 1:4,000 potassium permanganate solution, either poured over the parts or used in a sitz bath, three or four times daily for 7 to 10 days. No douche or local treatment is given in this stage.

Subacute.—If the patient is within 2 months of term visits are to be twice weekly; otherwise once a week. This stage of the disease usually requires 4 to 5 weeks of treatment. Restrict activity to a minimum. *Urethral treatment.*—Given each visit. A small narrow absorbent cotton tampon is folded over a ball-pointed probe. The tampon is then saturated with 50 per cent silvol and inserted into the urethra, leaving about one-fifth of it protruding from the orifice. The patient is instructed to leave in the tampon for four hours if possible. The act of voiding will expel the tampon. *Cervical treatment.*—On each visit to the clinic the cervix and vagina are thoroughly dried; and then gently swabbed with a 1:500 metaphen solution. The patient is instructed to take a 1:4,000 potassium permanganate douche twice daily at low pressure and body temperature; the douche to be taken with the patient lying down over a douche or bed pan. She is instructed as to the sterilization of her douche equipment.

Chronic.—Visits to the clinic are to be at intervals of two weeks if the patient reports within the first five months of pregnancy; and weekly if the first visit is after the fifth month. Continue treatment until term. If smears and culture become negative, visits can be extended to intervals of two to three weeks. Ordinary activity, but no fatigue, is permitted. Urethral treatment, on each visit, as described above. Cervical treatment, on each visit, as described above; 1:4,000 potassium permanganate douche once daily. *N.B.*—Electrocauterization, diathermy, or any intracervical treatment is not used at any stage of the pregnancy. Sulphanilamide is not given prenatally, because of possible toxic effects.

Post-partum.—Every patient is instructed to return to the clinic at the 6th week post-partum for further treatment if smears or cultures are still positive; and for three months further observation if negative. She is discharged as cured following three months' post-partum observation, if monthly cultures are reported negative. These cultures are taken as nearly as possible following the conclusion of each menstrual period, or once a month if the patient is not menstruating.

CONCLUSIONS

1. The incidence of syphilis in pregnancy would appear to be decreasing as a result of education of the public, venereal disease control measures, adequate facilities for, and improved methods of, treatment.

2. Wassermann and Kahn tests should form an integral part of every prenatal routine.

3. As a general rule the clinical manifestations of syphilis are less marked in the pregnant than in the non-pregnant woman.

4. The pregnant patient tolerates anti-syphilitic treatment as well or better than the non-pregnant, and every syphilitic pregnant patient should be treated, unless a serious contraindication to treatment exists.

5. Anti-syphilitic treatment is safe essentially, providing arsenical dosage is moderate and the patient kept under close observation for evidence of toxic manifestations.

6. Congenital syphilis and other evidence of fetal-placental syphilis is theoretically completely preventable, providing early adequate prenatal treatment is given.

7. An outline of the routine plan of prenatal anti-syphilitic treatment, as followed by the Special Treatment Clinic of the Toronto General Hospital, is included.

8. The incidence of gonorrhœa in pregnancy appears to be declining for the same reasons as stated in regard to syphilis.

9. The clinical and bacteriological search for evidence of gonorrhœal infection should form part of every prenatal routine.

10. Adequate prenatal treatment of gonorrhœa practically eliminates any danger of post-partum maternal gonorrhœal complications.

11. Adequate prenatal treatment of gonorrhœa combined with the immediate neonatal use of the Credé prophylactic technique will give the infant almost absolute protection against ophthalmia neonatorum.

12. The routine plan of prenatal treatment of gonorrhœa, as followed by the Special Treatment Clinic of the Toronto General Hospital, is included.

The writer is indebted to Dr. Noble Black, of the Special Treatment Clinic Staff, Toronto General Hospital, for the outline of the prenatal treatment of syphilis in pregnancy, as included in this paper.

The assistance of Miss Phyllis Denne, of the Social Service Department, Toronto General Hospital, in regard to the statistical data presented, is much appreciated.

The writer is also indebted to Dr. W. W. Wright for permission to include data as to the incidence of in-patient cases of ophthalmia neonatorum at the Hospital for Sick Children, Toronto.

The complete references for this paper can be obtained on application to the author. The small figures in the text refer to these.

SKIN TESTS IN WHOOPING-COUGH.—A. R. Thompson reviews the literature and records his observations with the intradermal test in 1,300 cases of whooping-cough. He was unable to support the claim that the intradermal response to Sauer's vaccine in the strength commonly employed (10,000 million organisms per c.c.) was of value either in demonstrating immunity to whooping-cough or in the early diagnosis of the disease. The bacterial content of the vaccine appeared to be too high for skin-testing purposes, giving rise to inflammatory lesions of a non-specific character rather than to specific allergic reactions. The intradermal response to pertussis endotoxin, on the other hand, produced a reaction resembling that seen in the Dick and Schick tests. Similar reactions, however, could be elicited in the skin of about 30 per cent of individuals with no history of the disease, but this might have been due to latent immunization. Thompson concludes that the pertussis endotoxin test is of some value in assessing the immune state of the individual, and also as a diagnostic reaction in early, atypical, or late whooping-cough.—*J. Hyg.*, Camb., January 1, 1938, p. 104. Abs. in *Brit. M. J.*

THE TREATMENT OF AMŒBIC DYSENTERY

(A REPORT OF 10 CASES)

BY PAULINE BEREGOFF-GILLOW, M.D.

Montreal

A GREAT deal has been written on the effect of drugs on amœbæ, both *in vivo* and *in vitro* but little regarding the patient's response to the infection itself or to the drugs used in combating the disease. Why some clinicians report failures with a drug with which others have obtained success is because not all patients respond in the same manner to the same agent, especially when the infection is of long standing, nor do all respond in the same manner to the pathological agent—the amœba. It may, therefore, be of interest to report this series of cases which presented a varied response to amœbic infestation.

The treatment of amœbic infection depends to a great extent on the duration and extention of the disease. The earlier the diagnosis, the quicker the therapeutic response, the less toxic and anæmic the patient, the quicker the response to the medication. While some patients may have an idiosyncrasy for a certain drug and show toxic symptoms after the smallest dose others will tolerate large doses with beneficial results. It is necessary, therefore, to use a medication which shall be clinically non-toxic for the patient involved, yet highly curative.

Numerous anti-amœbic drugs are on the market, among which the alkaloids of ipecacuanha (particularly emetine) and the Kurchi alkaloids have been used extensively. Stovarsol (acetarsone), yatren, also known as chiniofon (a halogenated oxyquinoline), vioform (iodochloroxyquinoline) and carbarsane (4-carbaminophenyl-arsonic acid) are chemicals containing a high percentage of arsenic and should be used with extreme caution when there is liver disease. The bismuth iodide salts have also been found valuable when other drugs have failed.

In the acute stages of the infection and when there is hepatic involvement emetine is the most useful agent. While it is very toxic, used with caution, it seldom produces untoward effects. An occasional patient may show an idiosyncrasy to it; others may tolerate large doses. I know of several patients with marked liver damage (amœbic abscess) who have been taking emetine periodically during two years or longer without detrimental effect. The dose, however, must be small and repeated only after a sufficient rest period. One-half grain tablet (B.&W.) given hypodermically twice daily for a period of ten days, followed by a rest period, is well tolerated. It is my experience that the hypodermic made from the tablet when needed causes less discomfort than does the preparation in ampoule form. Patients have told me that they could not stand emetine, that they feel nauseated and weak following the injection, for which reasons their doctors did not use this drug. Nevertheless, I gave these same patients emetine in full doses under the disguise of "a stimulant injection". The effect produced was remarkable. During the rest period an arsenical preparation should be given.

CASE 1

Mrs. C.R., housewife, aged 32, was first seen in November, 1934, complaining of epigastric distress, colic, diarrhœa with tenesmus. One year previously she had been treated in a local hospital for similar complaints, at which time she received ten injections of emetine, retention enemas of yatren, and bismuth orally. Within two weeks she was discharged. Five months later the old complaints recurred, when again yatren and bismuth helped her, but for a short time only. When I saw her she weighed 138 pounds. The heart and lungs were normal; blood pressure 115/70. The liver and spleen were not palpable; the sigmoid was slightly tender. The sigmoidoscopic examination revealed several shallow ulcers, the exudate from which showed motile trophozoites. The liver function test, basal metabolism, urine, blood chemistry and blood count were essentially negative. The fæces were mucoid and bloody, containing cysts and trophozoites of *E. histolytica*.

Treatment.—(1) Smooth diet, with raw ground liver daily; (2) a daily cleansing enema with 1-20,000 aqueous metaphen sol., 1½ to 2 quarts, at a temperature of 45° C. (rectal) for 2 weeks; (3) one-half hour following the cleansing enema, a retention enema of one gram yatren in 100 c.c. water (45° C.) for 1 week; (4) sodium amytal given 15 minutes before the retention enema, to aid retention; (5) emetine (B.&W.) hypodermic tablets, gr. ½, twice daily for ten days; (6) a rest period of 1 month accompanied by a high vitamin diet, and treatment repeated; (7) a rest period for three months; diet as above, with the addition of calcium gluconate and iron orally; treatment repeated; (8) periodic stool examinations were made at one to two weeks' interval during rest periods, and observation was continued for one year. The patient is in perfect health and free from any evidence of infection.

CASE 2

Miss K.C., a student, aged 19, born in Scotland and having lived in Montreal and the United States, was referred to me in January, 1936, with complaints of epigastric distress (gas) and diarrhœa off and on for a period of 2 years. She looked frail, feverish and anæmic; weight 120 lbs. Her temperature range was between 99 and 102°. The lungs were clear; the heart not enlarged. A soft faint systolic mitral murmur was perceived, usually during an elevation of temperature. Blood pressure 99/65; pulse regular but of poor volume. The liver and spleen were not palpable; the sigmoid was very tender. Liver function test and blood chemistry were negative. Red blood count 3,600,000; white blood count 10,000; hgb. 70 per cent (Sahli). The differential leucocyte count was within normal limits. Urine negative; except for a marked indicanurea. Fæces negative for the enteric group of organisms, but showed cysts of *E. histolytica* and *Cercomonas hominis*. There was a moderate amount of mucus but little blood. The movements were often involuntary.

Treatment.—As in case 1 with the following exceptions. (1) In addition to the diet a concentrate of vitamins B, G, and C with iron was given; (2) unable to tolerate yatren, she was given 2 grams of carbarsane in the retention enemas for a period of 12 days. She also received carbarsane orally during the rest periods (4 grains t.i.d. until a total of 5½ grams were taken); (3) the third series of emetine was given orally, ½ gr. tablet coated with 5 grains of salol (specially prepared), one daily for 20 days. Within 3 months she had a practically normal blood count, gained in weight, and showed no evidence of the infection in the fæces, yet she had a nervous urge to run to the bathroom on the slightest provocation, but actual movements would be only 2 to 3 daily. Triple bromides, taken after meals of high caloric value, with gradual gain in weight, overcame this difficulty and she is at present in perfect health.

CASE 3

Mr. H.N., 33 years, journalist, born in Montreal; resided in Chicago during the epidemic of amœbic dysentery in that city. In December, 1936, I was called to see him in consultation at a local hospital, where he had been for 5 months, with constant diarrhœa, cramps, tenesmus, foul discharge from the rectum, and tender, swollen joints. There was no history of rheumatic fever in childhood. His present illness dated from October, 1934, at which time he complained of diarrhœa, cramps and fever. He was treated at home and later in a hospital (Chicago) where he remained for 4½ months. He came to Montreal apparently in good health until January, 1936, when the above symptoms recurred and the pains in the joints were first complained of. He was admitted to a local hospital, where, after a period of three and one-half months of showing no improvement, an ileostomy was performed. During the stay in the hospital he received but three injections of emetine as he could not tolerate the drug. After many yatren retention enemas amœbæ were still found in the stools. He lost 30 lbs. The ileostomy did not seem to control the constant urge to move the bowels. He was sent home by ambulance and remained there for 5 weeks, suffering acutely. He was then readmitted to another local hospital at which time I was called in consultation.

The man was emaciated, pale, and suffered acutely from swollen tender joints. His lungs were clear. The heart presented a soft systolic murmur at the apex. Blood pressure 92/60; pulse small, regular but frequent. Abdomen distended and tender, especially over the palpable sigmoid. The liver was felt 2 inches below the costal margin. Through the lower ileostomy opening there was a constant foul discharge, as also from the rectum. The ankle and wrist joints were markedly tender. The blood chemistry and urine were negative. The count showed a moderate secondary anæmia, and the leukocyte count was 14,000 with 80 per cent neutrophiles. The fæces consisted of mucus, pus and blood, and showed numerous cysts of *E. histolytica*.

Treatment.—As in case 1 with the following exceptions. (1) The daily cleansing enemas of 1-5,000 CuSo4 were given through the ileostomy opening, and more solution was used (2 to 3 quarts); (2) yatren proving ineffective in this case, carbarsane, 2 grams, was used in the retention enemas in 100 c.c. water (per rectum); (3) during the emetine rest period he was given carbarsane, 4 gr., t.i.d., orally, receiving a total of 5 grams; (4) daily irrigations of CuSo4 solution were continued for 3 weeks followed by hot saline solution (temperature 47° C.) every other day and instillation of metaphen in oil 10 c.c.

Within one month after he was able to be out of bed for short periods, the first time in two years. Note that while formerly emetine was not tolerated there was no difficulty at this time. The joints cleared up as soon as improvement of the intestinal condition was noted. After 3 months a physical examination revealed that he had gained over 20 lbs. His blood count definitely improved. He had no discharge from the rectum, and the sigmoidoscope revealed only slight congestion but no evidence of ulceration. Smears and cultures taken during the examination were negative for amœbæ. It is about one year since; he is in good physical condition, and he is expecting to enter a hospital for closure of the ileostomy.*

CASE 4

Mrs. C.C., 50 years, housewife, born in Scotland and had travelled a great deal abroad. In December, 1936, she consulted me for mucoid diarrhœa, alternating with constipation, cramps and a great deal of gas. Her past history was irrelevant except for a cholecystectomy in 1925. Her daughter (case 2) was recuperating from amœbic dysentery. The patient was well nourished. She showed a slight icteric tinge of the sclera and buccal mucosa. The heart was not enlarged; no murmurs; pulse slow and irregular, with extrasystoles. (The electrocardiogram showed a sinus arrhythmia and ventricular extrasystoles). Blood pressure 110/68. Lungs clear. Liver palpable 2 inches below the costal border. Spleen not felt. Sigmoid slightly tender. The blood chemistry was negative except for the van den Bergh, 1½ units. The count showed a moderate secondary anæmia. The fæces, grossly, showed only an abundance of mucus; microscopically, red blood cells were present and cysts and trophozoites. A basal metabolism was -15.

Treatment.—As in case 1, except as follows. (1) Diet, fat-free, but high in vitamins and minerals; (2) desiccated thyroid (Parke Davis) grain 1 daily; (3) calomel, grains 2, in fractional dosage followed by a mild laxative given before commencing irrigations (once only); (4) emetine was given, ½ grain only daily for 2 weeks (hypodermically).

In this case no arsenical preparations were given orally, and retention enemas were permitted to be retained for 1 to 2 hours only, and, if not expelled, a saline irrigation was given. The fæces were free from amœbæ on the 4th day after beginning treatment, and negative ever since. She has been in good health ever since.

CASE 5

Mr. R.D., 29 years, a marine engineer, born in Canada, consulted me in August, 1937, complaining of diarrhœa with inability to control bowel movements, cramps, tenesmus, loss of weight, fever and complete loss of appetite. His past history revealed similar complaints in January, 1929, with recurrences off and on until January, 1936, when he entered a local hospital (previously having been treated privately at home). Amœbæ were found in the stools and he received

* Since this manuscript was sent for publication, the patient has had the ileostomy closed with establishment of perfect bowel function. His health is excellent. I am grateful to Dr. S. J. Martin, of the Montreal General Hospital, who performed the operation, for the interest he has taken.

started from one-half hour to one and a half hours after meals and lasted about an hour. Its regularity was suggestive of duodenal ulcer, but it did not respond to the treatment for ulcer. This symptom persisted for five years until the special diet was started and has been present occasionally since then. In 1934 she began to have severe urticaria involving the face, particularly about the left eye; at times the swelling was so great that she could not open the eye. There was also a moist eczematous rash around the ears, and occasionally there were attacks of conjunctivitis. All protein skin tests done by the scratch method gave negative results. The proteins tested included all the common foods and inhalants. A diet was then built up by the method of Rowe, in which new foods were added gradually. It was found that the patient was sensitive to wheat, eggs and milk mainly, and also in lesser degree to a number of other foods. When a diet was constructed to avoid these proteins she had almost complete relief from both the skin reactions and the abdominal pain. The eating of one slice of bread would bring on pain in the abdomen and swelling about the eyes in one hour. She continued patiently on this very restricted diet for three years, and during this time whenever she tried to use either wheat, eggs or milk she had a prompt return of the trouble. The result was that she could never eat away from home and felt depressed.

I started the use of protamine zinc insulin on November 8, 1937, giving her five units once a day. From the first dose there was an improvement in her condition; she experienced a sensation of well-being that she had not had for years, and was able to eat bread again with no distressing reactions afterwards. This applied to all the foods that had disturbed her previously. The only disadvantage of the treatment was the severe local reaction that she had after each injection of the insulin; swelling, redness and intense itching came on in a few hours and lasted about three days. The treatment was changed then, and regular beef insulin was used for a few days. The local reactions continued. Pork insulin was then tried with the same result. Finally, through the courtesy of Dr. D. A. Scott, of the Connaught Laboratories, we obtained a supply of crystalline insulin. This has stopped the reactions at the site of injection, and the use of five units once a day has controlled almost entirely the former allergic symptoms. The patient is quite sure that none of the other forms of insulin has given her quite such a good result as did the protamine zinc insulin, but the itchy swellings afterwards were too uncomfortable to allow its use. Later, when it is produced, we intend to try protamine and zinc combined with crystalline insulin.

CASE 2

The second patient was a man aged 72 who had had a supra-pubic cystostomy. During the prolonged period of drainage of the bladder he developed an acute attack of generalized urticaria. This was the severe type that gives such difficulty in treatment for none of the usual measures give more than temporary relief. The use of sodium bicarbonate, sponging, and magnesia and codeine by the mouth was continued from the onset on a Sunday until the following Saturday when the itching and swelling were as bad as at first.

Then eight units of protamine zinc insulin were given. In about three hours almost all signs of the urticaria had gone, and the period of freedom continued until the following Tuesday evening, when a few small hives appeared. The same amount of insulin was given on the next morning with the same prompt response, and there has been no recurrence of the attack.

At the present time one can give no reasonable explanation of the mode of action of insulin in these cases. It offers, however, an interesting field for speculation and experiment. If it is through some modification of the body responses of the kind called allergic it may possibly have a wide application to conditions other than urticaria, such as hay fever and asthma. The small size of the doses used in these cases makes it reasonable and safe to experiment with patients, as there is no discomfort or danger involved and the response is likely to occur with a few doses.

SUMMARY

Two cases of urticaria are reported which showed remarkable improvement with the use of small doses of insulin. One of these was associated with sensitivity to wheat, eggs and milk and the other was of unknown cause.

This preliminary report is offered so that others may try the effect of a simple and safe treatment in this and similar conditions.

DEATHS IN TETANUS: THE PHENOMENON OF TOXIN-RELEASE*

BY W. E. B. HALL, M.D.

St. Joseph, Mo.

FROM time to time the treatment of a disease has been suddenly terminated during the course of serum administration. In most instances this has been blamed on "anaphylactic reaction". Six cases, four of them fatal, have been carefully studied, and appear to demonstrate a very different mechanism in these dramatic forms of serum reactions. All these cases were connected with anti-tetanus serum administration, but the conclusions derived would appear to hold true for the entire field of serum therapy. Three cases, seen in Harrisburg Hospital, Harrisburg, Penn., developed hæmolysis on introduction of serum intravenously and were reported at length in a recent publication.[4] Three other cases, observed in the Episcopal Hospital, Philadelphia, Penn., were characterized by what might be called "acute massive tetanismus" on introduction of serum intrathecally. These cases are as follows.

* A paper presented before the St. Joseph Medical Journal Club, St. Joseph, Mo., on June 28, 1937.

CASE 1

Hæmolysis.—A young female student, twelve years of age, was injured in the hand on July 4th by the explosion of a blank cartridge, and received 1,500 units of prophylactic anti-tetanus serum. Eleven and one-half days later she developed stiffness of the jaw, and was admitted to hospital on July 17th, thirteen days after the injury. She was found non-sensitive to serum, but was routinely desensitized. She tolerated 10,000 units of anti-tetanus serum intramuscularly without reaction. Fifteen minutes later intravenous administration of 10,000 units of serum was started. Before half was given the patient suddenly sickened and the injection was stopped. She became semi-conscious, cyanotic, spastic, and developed purpuric hæmorrhages over the entire body. Blood withdrawn thirty minutes later showed complete hæmolysis with marked destruction of the white cells as well. Death occurred five and one-half hours later. Permission for an autopsy was not secured.

CASE 2

Hæmolysis.—A male, aged 28, suffering with compound, comminuted fractures of the lower leg, was given prophylactic dose of 1,500 units of anti-tetanus serum after desensitization. He gave a history of previous serum administration. Gas gangrene developed within forty-eight hours. After another desensitization he was given mixed anti-tetanus gas gangrene serum intravenously. An anaphylaxis-like reaction developed promptly, combined with oppressive sensations over the chest, not unlike those of transfusion incompatibility. Injection was stopped, and unmixed anti-perfringens serum was later given intravenously without reaction. The patient developed a considerable icterus within twenty-four hours and a hæmoglobinuria lasting several days. He recovered.

CASE 3

Hæmolysis.—A male, aged 46, with compound, comminuted fractures of lower leg. Anti-tetanus serum was given. The wound healed slowly, and on the tenth day showed *Cl. Welchii*. Mixed anti-tetanus gas gangrene serum was administered after routine desensitization, although the patient tested as not sensitive to serum. He developed mild collapse, nausea, etc., but the administration was continued in diluted form. A severe icterus and hæmoglobinuria developed. Patient recovered.

CASE 4

Tetanismus.—A male, aged 13, stepped on a nail and was given prophylactic 1,500 units of anti-tetanus serum. Eleven days later stiffness of the neck was noted, followed by stiffness of the jaw and later opisthotonus. Tetanus was diagnosed on admission to the hospital. No clonus was present. Under light chloroform anæsthesia he was given 5,000 units of anti-tetanus serum intraspinally without reaction; 15,000 units of anti-tetanus serum, diluted in 200 c.c. of saline, were started intravenously. When one-quarter had been administered the flow stopped. Convulsions soon developed and rapidly became increasingly violent, during which respirations stopped. The heart continued to beat strongly for some time. Permission for autopsy was not secured.

CASE 5

Tetanismus.—A male, aged 14, received an explosion wound in the hand from a blank cartridge. He was given 1,500 units of anti-tetanic serum, later followed by the development of a rash. Ten days later he developed stiffness of the jaw and pain about the neck, and was brought to hospital eleven days later. The patient did not appear at all acutely ill. He was given 20,000 units of anti-tetanic serum intraspinally and 20,000 units intravenously. This was followed shortly by sudden collapse, cyanosis and increased respirations. The heart action collapsed and opisthotonus developed. Permission for autopsy was not secured.

CASE 6

Tetanismus.—A male, aged 14, was wounded in the hand by the explosion of a blank cartridge, and later was treated with prophylactic anti-tetanic serum. Nine days later he noticed some dysphagia. At fourteen days this became markedly increased, and was accompanied by immobilization of the jaw, and fixation of the head. On admission to the hospital lumbar puncture was done, 20 c.c. of spinal fluid were withdrawn and 20,000 units of anti-tetanic serum were given intraspinally, and preparations made to give more serum intravenously. As soon as the administration was started the operator stopped to change his needles, and the boy suddenly became very restless, cyanotic, gasping for air, and called out about pain in his head. He became deeply cyanosed. Artificial respiration was started immediately, and the patient was given oxygen and adrenalin. Improvement occurred momentarily. Several minutes later, the patient suddenly became universally rigid, and difficulty was experienced in moving the arms from the sides for artificial respiration. He became cold, cyanosed, and perspired heavily; his pupils became dilated and he frothed at the mouth. Universal rigidity developed, the heart became rapid, and this was followed by disorganized twitching of all body muscles. Death occurred shortly. Permission for autopsy was not secured.

DISCUSSION

Death in tetanus observed following intraspinal injection of anti-tetanus serum so far has been without satisfactory explanation. Wainwright[7] recognized the possibility of serious developments with intrathecal therapy, and stated, "The best way to increase the mortality of tetanus is to give antitoxin intrathecally."

The late A. P. C. Ashurst, discussing the last three cases, made the statement that they all appeared similar, death occurring within an hour of admission, and he felt that the death was not due to anaphylactic shock but rather to acute tetanus. Certain conditions are to be noted in these six cases.

(1) All cases presented one common feature, namely, a period within which sensitization to anti-tetanus serum would occur prior to the fatal administration of therapeutic serum. (2) All fatal cases actually had developed tetanus eleven or more days after the injury and after prophylactic serum therapy. (3) Serum sensitization appeared in only one case, and the fatal reactions occurred irrespective of negative reaction and routine desensitization. (4) In only one case was tetanus well advanced. (5) The development of tetanus-like rigidity, spasticity, and convulsions was definitely observed in cases 4, 5 and 6, and suggestively occurred in case 1. (6) Reactions similar to

those observed in case 1, namely, hæmolysis, resembling those observed in blood transfusion incompatibility, also were noted in cases 2, 3, 5 and 6, the last two also showing tetanismus. (7) The absence of tetanus in cases 2 and 3 would appear to be an important factor in the non-fatal termination of serum therapy, as these cases were identical in all other respects.

Certain factors will be noted in these cases. (1) Tetanus infection with liberation of toxins, namely, tetanospasmin and tetanolysin, capable of convulsion production and hæmolysis, together with the development of specific antibodies and a combination with and neutralization by them. (2) Eleven or more days' interval following injury, with accumulation of tetanus toxins, and a combination of the toxins with the prophylactic antitoxins. (3) Eleven or more days' interval for sensitization to prophylactic antitoxins.

The hæmolysis encountered unquestionably resembled that of incompatible blood transfusions. Reactions of varying degrees may occur even in well matched blood, and are characterized by headache, urticaria, chilliness, or progress to actual sensation of pain and compression about the chest with dyspnœa, dilatation of the pupils, perspiration, and increase of the pulse rate. Hæmoglobinuria may develop, along with severe lumbar pains in the serious cases, due to kidney ischæmia with subsequent anuria. The terminal shock state has been thought to have been anaphylactic, but recently it has been shown that this is really an extra-renal uræmia due to the filling of the kidney tubules by hæmoglobin precipitated in the acid urine.

Serum anaphylactic reaction, in the ordinary sense of the term, may be readily excluded from these cases in view of the absence of positive sensitization tests in five of the six cases and the routine desensitization performed. Serum as used today is relatively protein-free, only the pseudoglobulin fraction being retained. This shows little tendency to act as an antigen producing antibodies.[6] Nor has horse serum any hæmolysin for the human blood cells, while the anaphylactic reaction is mainly produced in serum-sensitive cases and develops no sooner than fifteen minutes to an hour after injection. This acute protein anaphylaxis is a reaction between antigen and antibody, occurring not in the blood stream but upon a body cell. Thus the dramatic events leading to hæmolysis and massive tetanic reactions must be through some mechanism other than an ordinary serum anaphylactic reaction. We may then assume two possible mechanisms: (1) release of a toxin from a previously inert or sublethal combined form; (2) an unusual form of anaphylactic reaction which the author believes is an unreported form of the Arthus phenomenon.

Toxin release.—The theory is presented that tetanus toxin in combined form was released from the easily dissociable combination as a result of post-prophylactic loss of antitoxin sensitization of the organisms to antitoxin, subsequent development of an anti-(antitoxin) or anti-amboceptor, and the final violent combination of the heavy therapeutic antitoxin and its secondary immune body, namely, the anti-(antitoxin). This reaction would resemble the replacement of a weak acid by a strong acid in an unstable acid-base combination, *i.e.*, toxin-antiamboceptor plus antitoxin become antitoxin-antiamboceptor and liberated toxin. We may assume that this reaction occurs not only for the usual tetanus toxin, namely, tetanospasmin, but also tetanohemolysin, and *could occur in any other disease capable of producing well-defined antigens and antibodies.*

This is further indicated in an unusual case of hæmolysis in a patient suffering with streptococcic puerperal sepsis. Hæmolysis occurred following a transfusion of compatible blood, which was later found to contain streptococcic anti-amboceptors. The recipient displayed the signs and symptoms of acute transfusion shock, developing severe substernal pressure symptoms and back pain, while her body was covered with petechiæ, which did not appear, however, at the site of injection of the anti-streptococcic serum. This serum had been administered prior to transfusion and *after* careful compatibility and blood-grouping tests had been made. This was a case of transferred sensitization, the blood of the donor containing streptococcic anti-amboceptors which entered into violent reaction with the anti-streptococcic serum, effecting "toxin-release" and an accentuation of the disease.

Within the blood stream and lymph tetanolysin enters into weak combinations with its antibodies, but within the central nervous system the toxin enters a fixed irreversible combination. The combination in the blood stream

does not form a new substance, and merely produces an inactivation of the antigens, so that although the tetanolysin is combined with the red-cells it does not produce hæmolysis because of the presence of the antibody. With the passage of time the amount of antitoxin steadily decreases, accompanied by a development of a specific antibody for the antitoxin itself and a very active sensitization for the antitoxin, so that within a period of ten or more days an extremely unstable biochemical compound is produced, in which accumulating tetanohæmolysin may be released from its combination with the weakened antihæmolysin on injection of therapeutic serum.

Question has arisen as to the possibility or significance of anti-antibodies. Bordet[1] and Ehrlich,[3] working on this, brought out some interesting facts, both showing the possibility of development of sera with anti-(antibody) effect, although their explanations as to the mechanism are varied. Their findings showed that after a period of sensitization an animal, previously injected with an antitoxin, would develop a serum with inherent transmitted antitoxin qualities, but capable of reaction with and neutralizing subsequent anti-sera. Thus, the blood of a patient developing tetanus after a period of sensitization to the prophylactic serum would become a serum possessing an antibody capable of reacting strongly with the therapeutic antiserum, breaking away from and releasing the unstably combined tetanustoxin, which, with a present high concentration of sublethal toxin, suddenly becomes violently activated.

Inasmuch as this reaction deals specifically with specific toxins and antitoxins and specific sites of reaction, it will be seen that these reactions should occur only when the therapeutic antiserum is injected into the site displaying an affinity for the original toxin. In the case of tetanohæmolysin this would be the blood. In the case of tetanospasmin it may be assumed that the original toxin combines sufficiently strongly with the specific site, namely, the synapses, to initiate a gradually increasing degree of effectiveness, although the original prophylactic antitoxin and later anti-amboceptors may be in combination with the toxin. This inefficient chemical combination would be broken and the tetanospasmin completely released to work its complete effects on introduction of the specific antiserum within the spinal canal.

Arthus phenomenon.—The "Arthus phenomenon"[8] is not based on any biological affinity for a specific tissue, but rather for a given site previously sensitized. The present phenomenon is based for the most part on a release or accentuation of the action of an antigen on a specific tissue. Arthus[5] showed that animals became delicately susceptible to second injections after an interval of six or seven days, and that even very small injections could produce severe symptoms and even death in these animals. The reaction depended upon the repeated injections, high susceptibility and precipitin titres for severe reactions at 1/10,000 to 1/50,000. This reaction produced a precipitate of protein antigen and antibody, creating an inflammatory irritant attracting leukocytes and causing tissue damage, where the precipitation is in close contact with tissue cell. The sensitization is most marked after an incubation time of ten days, an interval noted in the present cases. This hypersusceptibility is serum-transferable, and even small amounts can make an organism highly sensitive. Although no cases of hæmolysis have been reported as occurring in an Arthus reaction this may be a factor in some of the present cases, particularly in cases 2 and 3, which did not display evidence of tetanus.

At present it is impossible to state whether this reaction could occur with any antitoxin reaction following intravenous serum-therapy, or whether this reaction is a specific reaction as part of the tetanohæmolysin affinity for red cells. Under certain circumstances the anti-amboceptor must assume and retain a specificity and affinity for given tissues similar to that of the original toxin, highly sensitive to and reacting specifically to its antigen. the original antibody, causing a degenerative change similar to that of the original toxin in the tissue of election, namely, the red cells. To some extent, this resembles the Arthus phenomenon, and would explain the reaction in the non-fatal cases of hæmolysis. In such a case the actual development of the specific disease and toxin would be unessential to the mechanism of this phenomenon.

If tetanus itself is actually present it is evident that tetanohæmolysin, its antibody, and

later the specific anti-antibody become fixed to the red cells, while tetanospasmin and the anti-spasmin, and later its anti-antibody become fixed in the central nervous system. Injection of antiserum into the blood-stream or into the spinal canal will produce violent reactions, resulting in "toxin-release", creating alarming symptoms and soon leading to death. This "toxin-release" would be accompanied by an Arthus-like reaction as one further cause of hæmolysis wherever the intravenous route of administration had also been chosen.

CONCLUSION

The specificity of the reactions for certain definite tissues would explain the absence of evidence of sensitivity or anaphylaxis when tested by the intracutaneous injection of serum. The conclusion derived from these cases is that we are dealing with an unusual phenomenon in immunology, specific in character and location. Essentially, if a person who has previously received an antiserum is given a subsequent injection of antiserum, *after the period required for sensitization, in a site for which the original toxin displays an affinity*, that a violent reaction occurs at that site. This reaction does not depend upon the actual development of the disease or toxin. In the absence of the toxin the reaction is degenerative, acting on the specific body tissue, the anti-antibody displaying an affinity of site and specificity of reaction resembling the original antigen. In the presence of the toxin or specific disease the reaction is similar to that noted above, together with a release of toxin from an unstable toxin-(anti-antibody) combination, *producing a violent accentuation of the disease complex*. This reaction does not depend upon ordinary anaphylactic phenomena and occurs in the absence of a positive skin test and after routine desensitization of the patient.

Although not found in the present cases, it is possible that "toxin-release" and the Arthus-like phenomenon might appear with intramuscular injection of serum. The absence of these reactions may be explained by the fact that while sera may be detected in the blood-stream in a matter of minutes the main fluid mass is absorbed relatively slowly. This may serve to effect a desensitization with the intervening tissues, muscle, capillary endothelium, etc., acting as buffers or insensitive intermediate agents.

The reactions may be avoided by *not* administering antiserum to anyone who has previously received this antiserum, at a site or in a tissue for which the original toxin would have an affinity. Thus in tetanus antiserum should not be administered intrathecally under such conditions, and if intravenous administration be deemed advisable preliminary tests for hæmolysis should be performed. Under the above conditions, this reaction may occur in any disease in which the toxin has an affinity for a definite tissue.

The intensity of reaction depends upon the titre of sensitivity, presence of the actual toxin at the site of affinity and the rate of administration and dilution of the antitoxin. When the reaction has been characterized by hæmolysis, the administration[2] of compatible blood, in amounts not over 300 c.c., acts as a detoxicant, and in amounts of 25 to 30 c.c., serves to relieve arterial spasm. When the hæmoglobin fraction has passed through the glomerular tufts it tends to undergo coagulation and precipitation in the usually acid urine, blocking the tubules, and leading to the characteristic uræmia of incompatible transfusion cases. Recent experiments have shown that this may be prevented by active alkalinization, the hæmoglobin remaining in solution in an alkaline urine.

SUMMARY

1. A case of total hæmolysis following intravenous injection of anti-tetanus serum is reported in a patient developing tetanus 11½ days after a cartridge burn, treated with prophylactic antiserum.

2. Two cases of hæmolysis, not fatal, in non-tetanus patients are reported following the therapeutic administration of intravenous anti-tetanus serum. Prophylactic anti-tetanus serum had previously been given.

3. Three cases of early tetanus are reported with "acute massive tetanismus" developing fatally, suddenly, after intrathecal administration of anti-tetanus serum. Prophylactic anti-tetanus serum had previously been given.

4. Five of the six cases were non-serum sensitive. All were routinely desensitized.

5. The non-fatal cases were those in which tetanus had not developed.

6. The explanation is an hypothesis believed to be: (a) "Toxin-release" through a replaced toxin-antiamboceptor combination in presence

of amboceptor sensitization, the serum antitoxin acting as the amboceptor and producing accentuation of the disease. (*b*) An unusual, unreported, Arthus-like reaction through red cell fixation of sensitizing amboceptor and antiamboceptor elements, not necessarily of hæmolysins reacting on the red cells. (*c*) Combinations of both.

7. The reaction occurs under the following conditions. (*a*) Previous administration of specific antiserum of any specific disease. (*b*) An interval of ten or more days for sensitization to the antibody. (*c*) Subsequent injection of similar specific antiserum into a site or tissue for which the specific toxin displays a peculiar affinity. (*d*) At that particular site, the toxin is then released from an inert or weak combination into an active, highly toxic form. (*e*) The presence of the specific disease or toxin at the site of affinity is essential to the phenomenon of "toxin-release". (*f*) The specific toxin may be present but is not essential in the unusual Arthus-like phenomenon of hæmolysis.

8. Intrathecal administration of antiserum, particularly in tetanus, is opposed, particularly if antiserum previously has even been used. In such cases, anti-tetanus serum augments the tetanus, emergency therapeusis is ineffective, and cases tend to terminate suddenly and fatally in "acute massive tetanismus".

9. The various precautions necessary to be taken in order to prevent "toxin-release", or the accompanying Arthus-like phenomenon, are detailed.

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Additional references and reprints of the author's paper (No. 4 above) can be obtained from him on application.

THE EFFECT ON DONORS OF REPEATED LIMITED BLOOD LOSS*

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IN the 1936 epidemic of poliomyelitis in Manitoba convalescent serum for the treatment of the disease was prepared in the Government Bacteriological Laboratory. One hundred and twenty-five donors reported, 65 males and 60 females; their average age was 25 years. The epidemic of poliomyelitis extended over a period of 4 months and it was found expedient to have each donor return at intervals and on each occasion to withdraw a comparatively small quantity of blood, from 65 to 140 c.c. The blood was collected in the morning; the donors abstained from breakfast. Fifty of the 125 donors supplied blood 6 or more times (the maximum was 12 donations) at an average interval of 1 week. An investigation of the physical condition of the donors 6 months subsequently disclosed certain facts.

Of the 125 donors none reported any ill effects. Forty-seven of the 50 donors who supplied blood on 6 or more occasions stated that they were improved in health; even those who were in apparently good health remarked on an increased feeling of well-being. Sixty-five of the donors noted an improvement in appetite, and 7 commented on a clearer and healthier tone of the skin. Three donors had been subject to scattered acne pustules; within 6 weeks following the first withdrawal of blood this eruption disappeared. One donor subsequently admitted she had been previously subject at intervals to outbreaks of urticaria; she has since remained clear of these attacks. Seventy-two of the donors increased in weight, the increase varying from 3 to 15 pounds.

The effect, if any, of the withdrawal of blood on the blood complement and blood volume was investigated. The complement power of the

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blood was determined by a method previously described.[1] No decrease in complement occurred, the titre remaining at the same normal level. No variation in blood volume (Haden Sanford method) was noted. No donor developed anæmia.

Each of these donors one or more years previously had suffered from an attack of poliomyelitis. A number were severely crippled, and 4 of these were far from robust; however, they had been selected because it had been determined that their blood carried a high titre of neutralizing substances. A definite improvement in the general health of these latter 4 donors was noted; they stated that they were able to move about with less difficulty, which would indicate an improved muscle tone coincident with the improved health and increase in weight.

I have had occasion also to withdraw 50 to 75 c.c. of blood on alternate days over a period of from 6 to 10 days from donors for the purpose of obtaining normal human serum to be used in the treatment of patients with septicæmia. Two hundred separate donors were included in this series. None of these donors suffered any ill effects; the majority were benefited by the procedure. I was impressed with the frequent and voluntary statement of the donors that they "felt better".

The various effects on donors following the withdrawal of larger amounts of blood (200 to 500 c.c.) have been noted by Giffin and Haines,[2] by Jones, Widing and Nelson,[3] and by Martin and Myers.[4] The first-mentioned observers report that certain donors increased in weight following an initial loss of one or more pounds. No initial loss of weight occurred in the donors under my observation who supplied limited amounts of blood.

From the earliest dawn of medical history blood-letting was the therapeutic sheet anchor of the physician in treating both the sick and injured. Song, story and pictures throughout the ages graphically depict the patient undergoing venesection at the hands of a physician or barber surgeon. The nature of the instruments employed reflect, if the procedure did not, the material advance of science dating from the cupping horn of the ancient Indian and Egyptian races down to the modern glass syringes and vacuum tubes of modern times. A prized heirloom of the Middle Ages was one of the costly Venetian goblets for holding blood.

"To let blood at the full of the moon and the height of the tides." Sancredo advocated 18 full porringers in 2 days. The procedure reached the peak of its popularity about 100 years ago. Besides venesection leeches were used, and it is stated that into one country, France, 40 million leeches a year were imported. In the 15th century a violent controversy waged as to whether the blood should be withdrawn from near the lesion, the teaching of the Arabs and of Hippocrates, or at a distance. Pierre Brissot advocated and practised the method of withdrawing blood at a distance from the lesion; he was banished by an Act of Parliament for such heresy. Unfortunately for his detractors, one of the King's relatives died from venesection by the Arabic method, and many medical reputations of that age suffered in consequence.[5]

During the past 50 years venesection has practically fallen into disuse, if not into complete disfavour. It is true, however, that in certain conditions, such as hypertension in the plethoric patient and in polycythæmia, this therapeutic procedure may on occasion be advised.

Few theories were advanced by the physicians of the earlier ages to explain the reason for the procedure, and the explanations offered, such as that the disease was withdrawn with the blood, were largely fantastic. It is possible that some of the beneficial results apparently obtained were the result of the additional therapeutic measure of administering copious amounts of water. While blood-letting gradually became discredited, little or no effort at scientific investigation or accurate clinical observation on the actual effects of the withdrawal of blood appears to have been made. The evidence here submitted indicates that venesection, or at least the withdrawal of limited amounts of blood, may prove beneficial.

Why should the removal of limited quantities of blood benefit the donor? Obviously, it is not so much a question of disease as of physiology. However, the physiological processes concerned in the formation and destruction of blood are not clearly defined, and we know less concerning the origin, destruction and re-

placement of the plasma. Then, too, our knowledge of the derivation and life of the numerous metabolic and immune properties of this substance is limited.

The increased well-being and the increase in weight are apparently physiological; the disappearance of acne pustules indicates a stimulation of certain immunity factors. Evidently, under certain circumstances the withdrawal of limited amounts of blood at regular intervals may prove of decided therapeutic value.

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RADIOTHERAPY OF CANCER OF THE BREAST*

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"THE rôle played by radiation in the treatment of malignant disease is one of increasing importance, both on the preventive and curative sides. In a number of cases of cancer the efforts of the surgeon, if unsupported by those of the radiologist, would be unavailing, and of course the converse proposition is equally true."—W. Sampson Handley.[5] These lines, written in 1922, are still the fundamentals of proper treatment of breast cancers.

During the past fifteen years radiotherapy has been greatly developed by improvement in the technique and the construction of apparatus. Biological research on cancerous growth, as well as on the cellucidal effects following radiation by roentgen or gamma rays, has been more thoroughly pursued. Still the judicious association of surgery and radiotherapy (x-rays and radium) remains the best treatment of mammary carcinoma. In the past decade, and more especially in the last two years, electrical engineering has built x-ray tubes and generators of very high voltage (one million and over) delivering penetrating roentgen rays the wavelength of which tends towards that of the gamma rays of radium. Technique in roentgenotherapy has been greatly improved by Henri Coutard (Paris), who, taking into account the factor *time* and also the quality of roentgen radiation through heavy filtration, has devised a new technique in the treatment of cancer which has proved very satisfactory, especially in malignant conditions of the larynx and oral cavity. In his lecture delivered before the Institute of Medicine of Chicago October 1, 1935, Coutard[4] insisted upon the fact that radiosensitivity shows a certain periodicity, that is, periodic increases to a maximum, followed by decrease to a minimum. This therefore implies that the period of maximum dosage of roentgen radiation should coincide with the highest radiosensitivity, and also that the inverse should be observed.

At the last session of the International Congress of Radiology (Chicago, 1937) Coutard[3] presented his five and ten years' results in roentgenotherapy of cancer of the larynx. A study of these has enabled him to draw definite conclusions as to the proper technique to be followed in the treatment by x-rays of cancer of the larynx, the pharynx and oral cavity. According to this author there exist two different modes of therapy: The first called "quantitative roentgenotherapy", is the simple elementary one in which *total dosage* and *continuous treatment* (daily exposures) are the two main factors, and the second, called "qualitative roentgenotherapy", is a physiological one, in which *heavy daily doses,* distributed at *opportune moments,* constitute, with the non-continuity of the treatment which is *periodical,* the two principal factors. By comparing the cellucidal effects of roentgen rays on differentiated and on undifferentiated cancers Coutard noticed that in the latter there existed a totalization of the individual unicellular epithelicidal effects, whilst in the former there existed antagonism of the effects produced by radiation.

To resume: the second method (qualitative roentgenotherapy) should be used in dealing

* Read at a District Meeting of the Ontario Medical Association, Ottawa, October 14, 1937.

with highly differentiated cancerous cells, and the first (quantitative roentgenotherapy) used in dealing with undifferentiated ones. If we accept Coutard's views as to the treatment of cancer of the larynx, pharynx and oral cavity, further research only will determine whether they can be successfully applied to the treatment of cancer of the breast.

Improvements in the technique of radium-therapy have followed those of x-rays through the use of bombs containing large quantities of radium element, which permits the irradiation of patients at distances up to 20 cm. This latter method, called tele-radiumtherapy, has almost eliminated interstitial irradiation, except when one has to deal with very localized areas or a single node. I would like here to insist upon the impracticability of interstitial radium in cancer of the breast, whether by radium-puncture with needles or by trocar introduction of gold radon seeds. Such a practice I most emphatically condemn as incomplete and as one that should not be used except on well circumscribed nodules and as an adjunct to a complete irradiation by x-rays or tele-radium. With so considerable a lymphatic circulation as that of the breast, composed of three main channels leading in different directions, how can one expect to administer a homogeneous irradiation to all the lymphatics by placing here and there in the palpable nodules small radon seeds, which have only a localized effect, without taking into account that these infiltrated glands are all linked by lymphatic vessels. With Simpson and Breed[11] I agree that radium-puncture in carcinoma of the breast is unsound and dangerous, and I wish to go on record as being absolutely opposed to it, except under the conditions above mentioned. Speaking of technique in radiotherapy one must not omit the name of Dr. G. E. Richards,[10] of the Toronto General Hospital, who has devised two radium applicators for treating breast cancer: (1) a felt vest loaded with radium needles, and (2) a special rotating radium bomb which is superior to the other bombs I have seen in Europe.

I will now consider the general tendency in regard to the treatment of breast cancer, as exhibited by various authorities in different countries, and then draw conclusions.

Although technique has been improved there is at present no anatomo-pathological evidence of cure of breast carcinoma by roentgen irradiation alone. Borak[2] declares that from roentgenotherapy palliation only should be expected, and that although a diminution in the size of the tumour always follows yet he has never been able to obtain total disappearance. After thorough consideration of his own cases and of those of other radiologists this author concludes that adeno-carcinomas of the breast are radiologically incurable, and he bases his opinion on the similarity of radio-sensitivity in the cases of sudoriparous glands and the normal mamma.

Adair,[1] of the Memorial Hospital, N.Y., is also of the opinion that radiotherapy alone cannot cure adeno-carcinoma of the breast. He has irradiated 117 cases (52 by radium and 65 by deep x-rays, following Coutard's technique). Total mastectomy was performed two or three months later and a pathological examination showed that only in 19 and 33 per cent, respectively, for the breast, and 4 and 22 percent for the glands was there a complete microscopic disappearance.

Antoine Lacassagne, of Paris, declared at the last meeting of the Canadian Medical Association in Ottawa, while discussing Dr. Richards' paper, that numerous attempts had been made by Coutard himself to treat breast cancer by roentgen rays, followed a few months later by radical mastectomy; in numerous cases the pathologist found cancerous cells still in activity. He added that until a pathological proof could be obtained roentgenotherapy should not be considered as a curative agent, but only as an adjunct to surgery or for palliative purposes. With these opinions I fully agree, but one must not forget that the converse proposition is equally true, and that surgery without radiotherapy is incomplete.

Medical literature and statistics from all parts of the world show that only through the proper combination of both these therapeutic measures and sincere cooperation between the surgeon and radiotherapist can one expect to cure cancer of the breast.

I do not wish to impose upon you any statistics, for these are numerous and often built up in order to suit the opinion of their author, so that some might lead to contradiction. As a whole, and taking into account Steinthal's stages, one must admit that stage 2 cases are those which benefit most from radio-chirurgical

association. The prognosis in stage 3 is bad, and in the very advanced cases better results are obtained by x-rays alone. This is explained by R. G. Hutchison,[6] of Glasgow, as due to the danger of transgressing surgically upon malignant tissues, and also because of the fact that tissues traumatized by operation are unable to tolerate a dose of radiation as large as can be applied to undamaged tissues. The treatment of breast carcinoma by surgery in the young gives poor results, and according to Lee the association of roentgenotherapy increases up to 30 per cent. the 3-year cures.

When dealing with bone metastasis Leddy and Desjardins[7] have demonstrated that roentgenotherapy gives improvement in more than 80 per cent for spinal and pelvic localizations, and that therefore it is the method of choice for such lesions. In accord with G. E. Pfahler may I state that there is no standard technique in the treatment of cancer of the breast, but that each patient should be considered separately as a morbid entity necessitating a personal technique.

Our way of proceeding at the Ottawa General Hospital is to select for each patient the particular treatment that is warranted by her condition, after consultation and examination by the Medical Board of the Tumour Clinic, which is composed of one specialist in each branch of medicine. As a rule stage 1 and stage 2 cases are operated on (radical mastectomy with exploration, and, if necessary, curetting of the axillary region), and before three weeks have elapsed x-ray treatment is started. A heavy filtration of copper is used, and the size and number of portals are devised in order to give an homogeneous irradiation to the breast and lymphatics. According to gland involvement and to stage, the doses vary on each portal from 900 r to 1,800 r units. Stage 3 cases are generally not operated upon, but treated by roentgenotherapy with high dosage, some of them having received as much as 3,000 r units per portal. The few patients in stage 3 who were operated on a few months after a complete series of roentgenotherapy did not show any improvement; moreover recurrence in the scar was noted. Such a short time has elapsed since the establishment of our Tumour Clinic that no valuable statistics can be given at the present time, but we have examined a sufficient number of patients who had been operated on incompletely and others who had not benefited from post-operative irradiation to condemn most strongly, on one hand, so-called conservative surgery, and to recommend, on the other, roentgenotherapy as the indispensable complement of surgery in the treatment of breast cancer.

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ESSENTIAL HYPERPIESIS. — R. Steinert has undertaken a study of the vital statistics for the whole of Norway for the ten-year period 1925 to 1934 in a search for information which might throw light on the common assumption that essential hyperpiesis is increasing in frequency as a result of the increasing psychic and physical stress of modern life. His studies were limited to the deaths of persons over the age of 50, as hyperpiesis is seldom fatal under this age. Since apoplexy is a common sequel of hyperpiesis, he argued that the deaths from apoplexy in the period under review would give a clue to the frequency of hyperpiesis in the same period. Indeed the experiences of his hospital in Bergen suggest that this condition is the main cause of most fatal cases of apoplexy, the number of which varied little from year to year during the ten years studied. He believes therefore that hyperpiesis has not grown appreciably in frequency in this period. On the other hand, in the same period there was a remarkable rise in the number of deaths traced to chronic disease of the myocardium, the rise being 48 per cent for men and 53 per cent for women. Even after improved methods of diagnosis had been discounted in connection with this rise a considerable portion of it must be held to be real and in conformity with the increase in chronic heart disease registered in most other civilized countries. The author does not think it legitimate, however, to argue from this rise in the frequency of deaths from chronic heart disease that there has been any corresponding rise in the frequency of hyperpiesis in the same period.—*Nord. med. Tidskr.*, December 11, 1937, p. 2013. Abs. in *Brit. M. J.*

CARCINOMA OF THE ŒSOPHAGUS

BY FRANK R. SCOTT

Toronto

IT is my intention to deal only with growths in the thoracic œsophagus, and only that part of it reached through a trans-thoracic incision.

The few cases of carcinoma of the œsophagus seen by the individual physician may give the impression that the condition is relatively uncommon. However, when one consults books on the subject a very different picture is seen. For instance, Watson describes a series of 506 cases; Jackson records 671; Vinson, of the Mayo clinic, reviews 1,000 cases; McGibbon, of Liverpool, states that his present series has reached 100 cases. This is only a small fraction of the number recorded.

The record of cases operated upon for carcinoma of the œsophagus is remarkably scant, for instance, of McGibbon's[1] 100 cases he reported that after investigation only one was regarded as fit for surgery, and at operation it was found that this case was too far advanced for a successful result.

A short review of the symptoms, pathology and course of malignant disease of the œsophagus is enlightening, and in a measure accounts for the rarity of successful interventions. For instance, almost everyone agrees that the earliest symptom of cancer is very vague, and its manifestations are regarded equally by the patient and doctor as quite unimportant. To emphasize this point it is only necessary to repeat Jackson's remark, that in 110 of his proved cases a diagnosis of a neurotic condition had been made in 87. This is a high percentage. Long before the period of pain has commenced the patient is likely to complain only of some abnormal, ill-described retro-sternal sensation which he regards as trivial, and which, for better description, the medical attendant may ascribe to a "nervous spasm". After a period of unknown duration, referred to by some as the "latent period", the main symptom of cancer of the œsophagus sets in, and by this I mean retro-sternal pain, at first induced only by the taking of solid food, but later becoming apparent on swallowing any kind of food, and still later a continuous pain described as of the pressure type. It is worthy of note that the dysphagia is produced by a narrowing of the œsophageal lumen by the tumour, and comes on in such an insidious manner that patients without thought and without notice, except perhaps by others, "dunk" their bread, biscuits and the like. They also are observed to masticate their food more thoroughly, which, in turn, leads to more fluids being taken to aid deglutition, and they also avoid hot foods. This goes on for a considerable number of months. Jackson states that a lumen of 5 mm. in diameter is sufficient to transmit foods prepared for swallowing as just described. Some attempt has been made to evaluate this "latent period", and while one observer fixes its duration at 3.4 months, which is the shortest estimate, the longest is fixed at 11 months. This is not having regard to the cases which were discovered by reason of the fact a foreign body was lodged at the site of the growth, this being the first indication of the presence of a neoplasm. The most common foreign body was the ubiquitous safety pin.

Complications.—The complications are nearly all due to interference with the function of the adjacent parts, and are relatively a late occurrence. Mentioned briefly, they are: (1) of every 10 cases of carcinoma of the œsophagus, 9 will die from purulent broncho-pneumonia and one from hæmorrhage (Souttar); (2) involvement of the recurrent laryngeal nerve producing alteration in the voice; (3) intercostal neuralgia of obvious origin. Naturally when these are present, surgery is out of the question.

The spread of the disease by the usual channels is well described in all textbooks, but one has only to examine the lymphatic drainage very casually to be convinced that early operation is the only hope surgically. In fact, to further use the hackneyed expression, the operation should be done "once—early and wide".

Pathology.—There is the widest possible variation in opinion regarding the degree of malig-

nancy of the disease. Some, amongst whom I will mention Abel, regard the condition as relatively benign. He goes so far as to state that in his opinion one in every four could be operated upon radically. Others, among whom is Vinson, regard the condition as highly malignant, as evidenced by the rapidly progressive clinical course. There also is the mid-way opinion, shared by Jackson, who regards the growth as fairly benign, so long as it remains inside the œsophagus; after penetrating it, it becomes extremely malignant. In any case the average length of life is in round figures well below a year from the time symptoms were first complained of.

I now follow with a brief description of my patient.

CASE REPORT

She was referred to me by Dr. H. F. Sproule, of Mount Dennis, who had received an x-ray report of possible carcinoma of the œsophagus at the junction of the middle and lower third. Her age was 59; she was unmarried. In spite of being a hard-worked housekeeper for many long years her physical condition was good, and her mental state excellent.

Her only complaint was that for six months before coming into the hospital on March 8, 1937, she had had increasing difficulty in swallowing solids and hot foods. Occasionally she had the sensation as though the food stopped at a point which she indicated by placing her finger over the xiphoid. On a few occasions whilst drinking hot fluids she said the pain described radiated through to her back. Her past history was negative, and the physical examination revealed nothing of consequence. The usual examination as to blood, urine, etc., was gone through and was well within normal limits.

On March 9th, I removed two small pieces through an œsophagoscope for biopsy, Dr. Meredith using pentothal as an anæsthetic. Dr. Sharp's diagnosis was carcinoma of the œsophagus.

A recheck of her physical condition was done to make sure she was fit for operation. In the main, Torek's technique,[2] as altered slightly by Dr. King[3] was followed. A description of this appears in the *Australian and New Zealand Journal of Surgery*, Vol. 6, 1936-7. My only addition to this was the introduction of a small stomach tube down the œsophagus, after anæsthesia, prior to beginning the operation. This, while probably unnecessary, most certainly made recognition of the œsophagus both in the chest and in the neck a very simple matter.

On March 16th, under novocain infiltration a gastrostomy of the Witzel type was performed. This caused her very little inconvenience. She was fed through the gastrostomy tube until March 19th. On the latter date the 4th, 5th and 6th ribs on the left side posteriorly, close to the middle line, were cut across through an appropriate vertical skin incision, again using novocain locally. On this occasion I used a Gigli saw instead of the usual rib cutter, and found it eminently satisfactory. Little or no unfavourable after-effect followed this operation. During the next four days air to the amount of 100 or 150 c.c. daily was injected into the left pleural cavity for the purpose of collapsing the left lung. This was to adjust the circulation gradually, instead of having the lung suddenly collapsed when the chest was opened a few days later.

On March 23rd the operation was completed. With the patient in the right lateral position, an incision was made along the 6th intercostal space almost in its entire length, this being the space below which the last rib was sectioned on a previous occasion. The rib-cutting incision was opened up and joined with the one just now mentioned. A rib spreader was introduced, which allowed very free inspection of the pleural cavity. There were several adhesions between the visceral and parietal pleura which required no further attention than dividing by cautery. As one looked into the chest, the arch of the aorta was on the right and the heart on the left. When the already collapsed lung was drawn aside, the stomach tube was felt in the œsophagus below the arch of the aorta, and was traced down quickly until the tumour was palpated. At this stage careful examination of the lung revealed no secondaries. A longitudinal slit was now made in the pleura between the aorta and the œsophagus, as made apparent by the stomach tube, from the diaphragm up to the lower border of the arch of the aorta, and again from the top of the arch to the cupola of the left chest. The œsophagus was delivered from its bed below the tumour downwards to the diaphragm and upwards to the arch. By gently lifting the arch of the aorta forward the œsophagus was freed from behind the aorta, care being taken that the recurrent laryngeal nerve was carried forward with the aorta to protect it from injury. In our case, as in others, nothing untoward happened when the two vagi were torn across. The dissection of the œsophagus was carried on above the aorta as far as the cupola. Torek, in his original operation, advised that a finger be passed up into the neck alongside of the œsophagus, and cut down upon from above. His remark was that he did not regard it as very good surgery, but it was very effective. In my case this was not done. The œsophagus was now doubly ligated and sectioned by cautery a short distance above the diaphragm. Rubber tissue was placed over the cut end of the upper segment and tied with silk, the ends of the silk being left long, so that when the neck was opened the œsophagus could readily be pulled up with forceps, passed from the neck to the chest, grasping this silk, which was placed in a convenient location above the arch of the aorta. The œsophageal opening in the diaphragm was enlarged slightly, to permit the stomach to be drawn up, so that the lower end of the œsophagus might be purse-stringed into it. Following this the œsophageal opening was closed—this for two reasons. First to prevent herniation; second, to prevent the spread of possible infection from the chest to the abdomen. The œsophagus was now attacked through the neck. The skin incision was along the inner border of the sternomastoid muscle. By drawing the sternomastoid and carotid sheath outwards and the trachea inwards the œsophagus was readily identified by the tube. In the dissection care was taken to avoid the inferior thyroid artery, from which this part of the œsophagus derives its blood supply. Dissection of the œsophagus from the neck down into the chest was carried out readily. The thread mentioned before was grasped with forceps, and by this means the entire length of the œsophagus was brought into the neck. With blunt scissors a tunnel was made from the original neck incision, over and just below the sternoclavicular joint, where the skin was opened. Through this tunnel the œsophagus was carried. After fixing the œsophagus to the opening below the sternoclavicular joint the redundant œsophagus bearing the tumour was cut off. The neck incision was closed with a few interrupted dermal sutures. The chest wound was now closed with silkworm gut, embracing a rib on each side of the skin incision. Drainage was provided by a stab wound at the lowest possible point of the chest. The anæsthetic was given by Dr. Meredith, who used 250 mg. of novocain crystals intra-spinally, supplemented by intra-tracheal cyclopropane. The anæsthetic was most satisfactory. At the conclusion of the operation the lung was filled out by means of the intra-tracheal tube.

At no time was there any indication of shock. The entire procedure occupied one hour and thirty minutes, and the patient was returned to bed with a pulse rate of 94 and blood pressure of 120. No intravenous treatment was given, fluids being supplied through the gastrostomy tube. The drainage tube in the chest was connected with a negative pressure apparatus and left in position for ten days. No trouble was experienced with the patient until after two weeks. When she was about ready to go home she suddenly developed pneumonia in the left lung, which gave us no inconsiderable concern for 12 days.

After ten days, a tube was placed in the upper cut end of the œsophagus and connected with the gastrostomy tube. Since then she has been able to take practically everything by mouth. This is accomplished by having all her meat and vegetables put through the grinder twice. Subsequent x-rays showed the left lung well filled. She has been doing light work since the middle of June.

The pathologist's description of the section now follows:

"*Material.*—Œsophagus section — lower half, with tumour.

"*Macroscopic examination.*—Received an opened portion of the œsophagus, measuring 6.5 cm. in length. Near one end there is a firm growth, measuring 3 cm. in diameter and extending through the whole thickness of the wall. Part of the surface of the growth is covered by smooth mucous membrane. In the centre there is an ulcerated area 2.5 cm. in length and 1 cm. in width, with raised, reddened edges. The deeper portion of the growth is white and gristly. To preserve the specimen, a section of the base of the ulcer only was taken.

"*Microscopic examination.* — (S-821). — A typical epithelium is growing in very irregular manner in solid sheets, cords and islands. Part of this growth is somewhat papillary. There is a marked cellular and nuclear variation. Several uninuclear giant cells are noted. In several areas there are epithelial perles, and in the more irregular areas mitosis is active. Slight keratinization is noted. Cells of chronic inflammation (lymphoid and plasma cells) are numerous. Many neutrophils are present in the ulcerated surface. The tumour is invading the muscle zone.

"*Diagnosis.* — Carcinoma (epidermoid) of œsophagus."

There are certain points about the procedure worth bearing in mind.

1. A sufficient number of x-rays should be taken so that an opinion may be given as to which side of the œsophagus the growth is arising from. On account of possible constriction due to the growth this is, conceivably, more readily ascertained in this way than by the œsophagoscope. The location of this tumour as thus determined will suggest whether the tumour will be more readily accessible through the left chest or the right chest. I cannot see that the procedure would be more difficult through one side than the other.

2. I am quite sure that the use of a stomach tube as before described was of considerable value.

3. Since there is much turning from side to side during the operation, the whole program should be understood, both by assistants and nurses. It will be readily comprehended of course that this is to avoid infection, since even mild degrees of mediastinitis are usually fatal.

4. After the lung has been decompressed a further x-ray of the chest will reveal the presence or absence of adhesions. These of themselves are not harmful, but might be sufficient in number and density to hinder decompression. In case adhesions of such character were present this information would be invaluable prior to the major operation.

5. Everything possible should be known about the chest before operation, since most of the deaths have been due to lung infection.

6. I regard the closing of the œsophageal opening in the diaphragm as important, for the purpose of preventing herniation and barring the escape of pleural contents into the abdomen.

7. Preservation of the inferior thyroid artery is essential for the life of the œsophagus; otherwise sloughing will occur, leaving only the opening in the skin. These skin openings are prone to scar down.

I am not content with any of the many operations proposed for the purpose of creating an artificial œsophagus. For the present, or until something that I regard as more reasonable presents itself, I shall be content to leave the patient as she is.

March 21, 1938. My patient was seen by me, two days ago, and is well. She is earning her living by working on a farm.

Dr. E. A. Moore acted as my very capable assistant in all the above procedures and has my most hearty thanks for his able assistance and cooperation.

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A CASE OF PELLAGRA

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THE case described herein is the first to be reported in this hospital.

CASE RECORD

S.S., Jewish, female, aged 24, was admitted March 31, 1934. For several months prior to admission she had been depressed and had made several suicidal attempts; she was said to have had alternate periods of excitement and depression. She had had "heart trouble" as a child and was kept in bed for a long period. The family history was negative as to psychoses or neuroses. Physical examination at the time of admission revealed that she was well nourished and well developed. The heart was not enlarged to percussion; a soft systolic murmur at apex. Blood pressure, 110/70. The tendon jerks were equal and active. There was no disturbance of sensation, coordination or gait.

The patient was quiet and cooperative. She stated, however, that she had to control impulses to scream and make a fool of herself. She worried because she had no feelings, and then stated that she was afraid of the world. She denied hallucinations and did not appear depressed, but complained that she was not herself, that she was mixed up and had strange thoughts in her head. Apparently, she was unable to make the necessary social adjustments to meet her environment. She was placed in the occupational therapy group, and psychotherapeutic conversations were used in the hope of effecting a better mental level. But her record for the next two years is nothing but a story of continual physical complaints. She was constantly asking for medicine for headaches, sleeplessness, dizziness, general malaise and indigestion. At times, she stated that she felt queer and confused. Her appetite was variable, but it was considered that her food intake was satisfactory. Periodically she would attend the occupational therapy class and do a little work on the ward, but in the main she was preoccupied with her physical complaints.

In May, 1936, she complained of pain in the back and a dull ache in the lower abdomen; she was examined by the consultants in medicine and in gynæcology, who found no pathological condition to account for her symptoms. X-rays of the vertebræ were negative. In August, 1936, she had an acute attack of abdominal pain, referred to the right lower quadrant and accompanied by nausea and vomiting; there was no fever and no leucocytosis, but, on examination, there was tenderness in this region, with some increased muscular resistance. The surgical consultant at this time suggested an acute pelvic condition, and she was again referred to Gynæcology. This condition subsided under conservative treatment, but after a further attack of abdominal pain the abdomen was opened in January, 1937. The appendix was found to be normal; the right ovary contained a small serous cyst which was removed. The gall bladder was found to be distended with a large number of stones. One month later (February, 1937) a cholecystectomy was performed. Following the second operation her convalescence was slow. After ten days, she was placed on a fat-free diet, but continued to complain of abdominal discomfort. Her appetite was capricious, and she refused to take milk, yeast, or cod liver oil. She complained that the taking of food caused severe abdominal cramps. Occasionally she was nauseated and vomited after meals. Tube-feeding was resorted to on a few occasions, as was the giving of intravenous glucose-saline. Later, she was put on small meals every two hours, but she showed little improvement. At this time (April) her general condition was poor. She was emaciated, showed a muscular asthenia; her skin was dry and loose; she could walk only a few steps at a time, with the back bent and a slow uncertain gait. She was rather lethargic and disinterested. Early in May, 1937, the first skin manifestation appeared, an erythematous area on the dorsum of the hands and between the fingers. This covered the same area on both hands, and gradually extended to just above the wrist; it was sharply demarcated from the normal skin and rapidly became dark brown in colour. Small blebs appeared and the skin of the dorsum of the hands later presented a weeping crusted appearance. The first facial eruption appeared after she had been out on the sun porch, and was similar to an erythema due to sunburn, except that it was situated over the bridge of the nose and extended on to the cheeks, in a typical butterfly configuration, the edges being sharply defined. Later, symmetrical areas appeared on the chin and forehead, the eruption gradually becoming pigmented and pustular. After three to four weeks, the skin was markedly improved, but healing left the affected areas thickened and pigmented. The onset of diarrhœa occurred about ten days after the first skin eruption and became so severe that the patient passed ten to twelve liquid stools per day containing occult blood. The stools were negative for parasites and a barium gastro-intestinal series showed only a very rapid emptying of the stomach and intestines. Gastric analysis revealed an achlorhydria, and the red blood cell count at this time was 3,950,000; hgb., 78.3 per cent. Under treatment, which consisted of bed-rest, revision of the diet, with the assurance of an adequate protein intake and the addition of yeast, beminal, cod liver oil, and fruit juice, liver extract was given intramuscularly. The diarrhœa subsided in two to three weeks. Her general condition, however, showed little improvement. She did not gain weight, but remained depressed and lethargic and, at times, irritable. On several occasions she became disturbed and noisy, expressing vague ideas of persecution.

At the time of writing, however, she has partial insight into her condition, is well orientated in the three spheres of time, place, and person, and shows a fairly adequate emotional reaction.

While pellagra is a rare disease in this country, and most cases reported in northern climates have been found among psychotic patients, the possibility of the disease should be kept in mind in cases of chronic indigestion with spring exacerbations, neurasthenia, and obscure abdominal symptoms. The diagnosis is readily made when the patient has entered upon the second stage of the disease and the typical syndrome is established, but by that time the prognosis is unfavourable. It would appear advisable, then, to regard all mental hospital

patients and other patients as well who present serious feeding problems as potential pellagrins, and to revise their diet accordingly.

The etiology of the disease is not yet unequivocally settled, but it is regarded by most workers as a nutritional deficiency, probably a dietary deficiency, but possibly due in some measure to disturbance in the absorptive mechanism of the gastro-intestinal tract, even when the important food elements are supplied in sufficient amounts. It is also possible that the various symptoms of the disease are due to a deficiency in several factors. Vitamin G, or vitamin B_2, the pellagra-preventive factor, has been shown to have several components, the chemical properties of which are not as yet fully determined. So far the supplying of food substances which contain the vitamin G complex is the most satisfactory method of treating the disease.

Pellagra runs a typical course. It appears to be more common among females than males, and characteristically the symptoms make their appearance in the spring or early summer, disappearing during the winter, to reappear the following spring. This cycle may persist for years or, in acute cases, a fatal termination takes place in a few weeks or months.

The first stage of the disease may be called the stage of neurasthenia. The patient complains of digestive troubles, loss of weight, vertigo, and is often extremely hypochondriacal. This stage may last for days or weeks. Next is the stage of the four D's—dermatitis, diarrhœa, dementia, and death. The dermatitis often follows exposure to the sun, and first appears on exposed surfaces, usually the back of the hands, as a bright red erythema, very like sunburn, which is sharply demarcated from the normal skin and bilaterally symmetrical. This later becomes deeply pigmented; vesicles and bullæ may develop, associated with hyperkeratosis and bran-like desquamation. Acute glossitis and stomatitis are frequent. The diarrhœa is accompanied by loss of appetite, flatulence, abdominal discomfort, and vomiting. General asthenia is often very profound.

The patients most frequently exhibit a more or less profound depression at the height of the disease. A resultant dementia is common. Most workers agree that pellagra may be the exciting cause of one of the recognized psychoses, or it may appear in a psychotic patient, especially in those who present feeding problems. In some cases, the posterior and lateral columns are affected, causing an uncertainty of gait, spasticity of the muscles, and various paræsthesias. In the acute, so-called typhoid type, there is usually fever, ranging from 99 to 104°, frequently accompanied by a low, muttering delirium. The pathological findings in the central nervous system include degenerative changes in the cord, more often the posterior columns, "central neuritis" in the cortex, *i.e.*, swelling of the giant cells of Betz, with displacement of the nuclei toward the periphery. At times the peripheral nerves are involved, showing degeneration of the myelin sheaths.

Treatment.—The diet should contain an adequate amount of protein; also a sufficient intake of fresh fruit, vegetables and cod liver oil should be assured. Yeast appears to be rich in the pellagra-preventive factor, and liver extract should be given parenterally. Dilute hydrochloric acid may be prescribed as well as massive doses of iron. There are preparations on the market containing both vitamin B_1 and B_2. Intravenous sodium thiosulphate has been recommended, 10 c.c. of a 10 per cent solution for twenty to sixty doses. Symptomatic treatment may be employed for the dermatitis and diarrhœa, but the usual measures used are ineffective until the nutritional deficiency is corrected.

I wish to thank the Medical Superintendent, Dr. C. A. Porteous, for his permission to publish this case, and for his helpful comments on the paper.

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Case Reports

SPINAL CORD INJURY WITHOUT EVIDENCE OF FRACTURE OR DISLOCATION OF THE VERTEBRAL COLUMN

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Injury to the cervical spinal cord is not infrequent, and all grades of severity occur. The warning is sometimes voiced that injuries of this nature may follow a dislocation or fracture that is reduced spontaneously so that little evidence of osseous abnormality is demonstrable. The following case is one of severe cord injury in the lower cervical region without any demonstration of fracture or dislocation by x-ray or autopsy.

CASE REPORT

On March 18, 1937, a woman was struck by an automobile while crossing the street. The car was travelling between 10 and 15 miles per hour, and the front fender hit her on the right postero-lateral aspect of the trunk and thigh, carrying her along for a few yards. She dropped to the pavement as the car stopped, hitting her head. She was unconscious for a few minutes, and was then seen to be paralyzed. Shortly afterwards she was admitted to the Toronto General Hospital, conscious, profoundly shocked, with a wound on the forehead, and quadriplegic.

Examination on admission.—A moderately stout Scotswoman of 57 years, complaing of headache, inability to move her arms or legs, pain in right buttock, thigh and back. She was very pale, and sweating over the face and neck; a small abrasion on the left side of the forehead; bruising of right thigh, lumbar region and leg. Her pulse was rapid and thready. She was treated immediately for shock with heat and intravenous saline.

There was no movement of any extremity or chest. Breathing was entirely diaphragmatic. Anæsthesia to touch and pin-prick was absent to the level of the second rib anteriorly and the points of the shoulders laterally; sensation was normal above this. The biceps, radial, triceps, abdominal, ankle and left knee reflexes were absent, but there was a slight response to the right knee-jerk. Plantar stimulation on either side caused a slight mass movement of the whole extremity. Tests of the cranial nerves were normal. Five hours later the patient looked and felt a great deal better. The tendon reflexes had returned and were bilaterally symmetrical. There was only a slight indefinite movement of the toes on plantar stimulation. The only voluntary movement was above the shoulders. Sensation to pin-prick and touch was unchanged. Deep pressure was localized without difficulty. Vibration sense, hot and cold, and sense of position were absent below the level supplied by the fifth cervical nerve. There was a narrow band of hyperæsthesia at the upper limit of the anæsthetic area. Blood pressure, 150/90.

Lumbar puncture showed clear fluid at a pressure of 250 mm. with an immediate response shown by a rise of fluid in the manometer tube when either jugular vein was compressed, and a rapid fall when the pressure was released. Microscopically, there were 10 lymphocytes per c.mm. and an occasional red cell.

Provisional diagnosis.—Partial section of the spinal cord due to fracture dislocation of the lower cervical spine, without block of the spinal canal.

Progress.—March 19th.—Stereo x-rays of the cervical and upper thoracic spine showed no evidence of bony abnormality except slight osteoarthritic lipping.

Her condition was generally unchanged; still quadriplegic and anæsthetic over trunk and extremities. Faint vibration sense was present in the left elbow. Temperature 101.° Retention of urine and fæces requiring catheterization every eight hours and an enema daily.

March 20th.—Spinal fluid faintly tinged with blood; no block of spinal subarachnoid space. Frequent massage and passive movement of all extremities being carried out. Temperature 101.°

March 22nd. — Completely anæsthetic over the trunk and lower extremities from the level of the fourth thoracic vertebra down anteriorly and posteriorly. Slight power was detected in the biceps, brachialis, brachioradialis, and deltoid bilaterally. Sensation to pin-prick was present over the outer aspect of the arms down to the insertion of the deltoid. She was still complaining of pain between the shoulders posteriorly. Tenderness, slight and not localized, was present in the lower neck dorsally. Painless generalized swelling of the left leg and foot, with prominence of the varicose veins, led to a diagnosis of femoral thrombophlebitis. Massage was discontinued. Temperature 103°; respirations 30 per minute; blood pressure 140/90. Medium and coarse râles were heard over both lung bases.

Repeated x-ray films failed to show any evidence of trauma to bone.

March 24th.—Obviously much worse. Temperature 106°; respirations irregular and laboured; blood pressure 120/70. Semi-comatose.

March 26th.—The patient died after being in coma for two days.

Laboratory findings.—Blood Wassermann test was negative. Spinal fluid (March 18th), globulin 1 plus, a rare red cell; presumptive Kahn test was negative. March 20th, globulin 2 plus; Kahn negative; colloidal gold test normal; a few red cells; total protein 58 mg. The urine contained no albumin or sugar; specific gravity 1.020 to 1.026; microscopically an occasional red cell, many white cells.

X-ray report (Dr. M. R. Hall, March 19th).—"Films show some osteoarthritic lipping, particularly well-marked in the lower spine. No definite evidence of fracture, dislocation or other osseous change demonstrable in the cervical spine or upper eight dorsal vertebræ." March 22nd.—"No evidence of fracture or dislocation in the cervical or upper half of the dorsal spine in the antero-posterior direction, nor of the cervical spine in the lateral direction."

Autopsy report (Dr. W. L. Robinson, A. 109-37).—Anatomical diagnosis: laceration of forehead, bruises of face, knee, lumbar region; subarachnoid hæmorrhage of brain and spinal cord (slight); petechial hæmorrhages in basal ganglia (bilateral, slight); posterior displacement of the fourth cervical intervertebral disc; epidural hæmorrhage of spinal cord (5th cervical segment, slight); trauma to spinal cord, (5th cervical segment); acute cystitis; acute bronchitis; partial collapse of lungs, œdema of the lungs (bi-

lateral); old pleural adhesions; arteriosclerosis and atheroma of the coronary arteries and aorta; fatty infiltration of the heart and liver; patent foramen ovale, thrombosis of the left femoral vein; paradoxical embolism; infarct of the right kidney; fibrosis of the appendix; hydronephrosis and hydroureter (right, slight); multiple polypi of the uterus; osteoarthritis of vertebræ (slight).

At post-mortem a laminectomy was performed to provide adequate and careful exposure of the spines, laminæ, ligaments and spinal cord of the cervical region. The laminæ, articular facets and associated ligaments were found to be intact, with no cracks or tears to be seen on manipulating the head with the

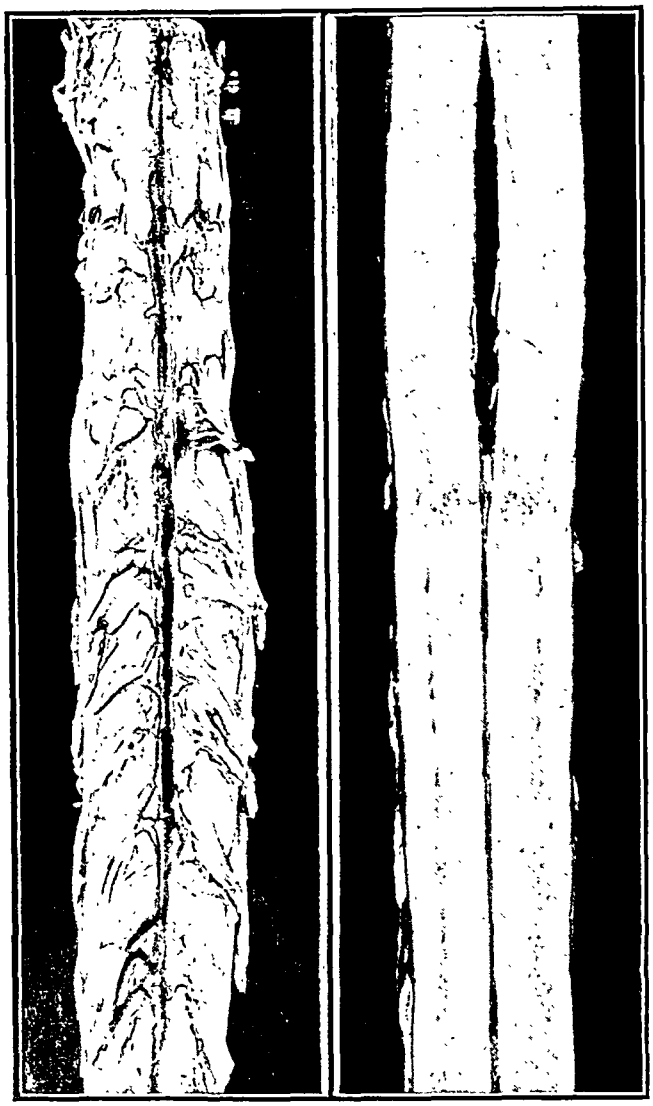


Fig. 1 Fig. 2

Fig. 1.—Ventral view of cervical and upper thoracic spinal cord. A small patch of subarachnoid hæmorrhage to left of anterior spinal vessels. Eight mm. below this a transverse line of poorer focus of the spinal cord tissue shows the level of the slight indentation of the cord by the trauma. **Fig. 2.**—The specimen has been bisected and opened so that the ventral surfaces of the two halves of the cord are towards the lateral side of the photograph. This shows the slight indentation of the ventral aspect of the cord with a slight bulging on the dorsal aspect. Between these two points there is a well-defined line of softened tissue measuring up to about 0.4 cm. in its vertical diameter. Slight hæmorrhage is visible in the softened cord tissue.

structures under direct vision. On exposing the contents of the spinal canal no abnormality was seen till the dura was opened, and then it was only on close examination that a small transverse lesion was seen on the dorsal aspect. This was 1 to 2 mm. in diameter and situated exactly opposite the intervertebral disc between the 4th and 5th cervical vertebræ. Anteriorly, at the same level, there was a flat, thin hæmatoma, 1 cm. in diameter, on the outer aspect of the dura. After removing the cord, the bodies and ligaments of the cervical vertebræ were dissected from behind. There was no rupture or tearing of ligaments and no evidence of fracture or dislocation. After removing the posterior longitudinal ligament, which was intact, it was noted that extreme flexion of the neck caused the intervertebral disc between the 4th and 5th cervical vertebræ to protrude about 2 mm. beyond the posterior edges of the bodies above and below. None of the other discs protruded in this manner. The protrusion was not sufficient to detach the posterior longitudinal ligament from its attachment to the adjacent vertebræ. No gross tears of the disc were present, and the ligamentous attachments at its periphery to the epiphyseal plates on either side were intact. The cervical vertebræ were not removed, and though the writer is morally certain that no fracture or dislocation was present, proof of the integrity of the vertebral column is not complete in this respect.

After fixation the cervical portion of the cord was split longitudinally and then transversely at the level of the lesion. On the ventral aspect the injury was marked by a transverse indentation and on the dorsal aspect by a very slight bulging. In the substance of the cord at this level a dark reddish softening involved a large portion of the transverse area, especially to the left and dorsally, where it reached a diameter of 0.25 cm., and grossly involved the posterior horn and neighbouring white matter. No other serious lesion was found at the post-mortem.

Sections were made of the dura mater, anterior spinal vein and artery, and the spinal cord at the level of the lesion (between the 4th and 5th cervical vertebræ), as well as of other organs.

Microscopical examination of the outer surface of the dura mater at the level of the lesion showed aggregations of red blood cells, which also formed hæmorrhagic collections in the outer layer of fibrous stroma. The latter was irregularly folded, suggesting that it had been torn. The middle and inner layers of the dura were intact and normal in appearance. The arterioles showed moderate intimal thickening but no thrombosis. The extravascular collections of red cells stained orange with Mallory's connective-tissue stain, which is compatible with their having been effused a week. The anterior spinal artery and vein examined below the site of the lesion were not thrombosed, red cells lying free in the lumen of each. The walls were not abnormally thickened nor was there any cellular reaction.

The sections of spinal cord at the site of injury showed irregular cavitation, most marked dorsally and laterally. Most of the nerve cells showed evidence of acute degenerative change. Nissl's granules were infrequently present, and then only at the periphery of the cell, central chromatolysis being noted in nearly all the nerve cells in the section. A few nerve cells at the level of softening were reduced to a shadowy outline surrounded by histiocytes. In many the nucleus was flattened out at the periphery of the cell. Mallory's connective-tissue stain showed extensive vacuolization by œdema. The small vessels in the surrounding tissues were markedly congested. The myelin sheaths were almost completely destroyed and degenerate axones were well demonstrated. Cresyl violet showed the presence of numbers of lipoid-filled histiocytes especially in the more cystic areas. Many

loose red cells were present in the regions of cavitation, and others among the nerve and glial structures showed the presence of scattered hæmorrhages throughout the section. There was no evidence of inflammatory reaction.

The clinical and pathological evidence both confirm the diagnosis of a transverse lesion of the cord at the level of the 5th cervical segment. Careful search failed to show adequate cause for the gross softening and hæmorrhage which caused death. Even though the lesion occurred at a place where the spinal canal is narrow in relation to the size of the cord it is hard to believe that the cord, enveloped in intact membranes and subarachnoid fluid, could sustain such a contusion by sudden jarring against the bony wall of the spinal canal. The very slight protrusion of the intervertebral disc on manipulating the head so that the neck was fully flexed, at the autopsy table, may be an explanation for the lesion found. There was no split present in the disc or expulsion of soft material, such as might indicate an acute rupture of the nucleus pulposus. Whether a satisfactory explanation is presented or not, the case demonstrates that a fatal cord lesion may occur without demonstrable fracture or dislocation.

I am indebted to Dr. K. G. McKenzie for permission to publish this case, and to him and Dr. E. H. Botterell for criticism and advice. Prof. E. A. Linell was most generous in providing the photographs and help regarding the pathological aspect.

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AN UNUSUAL AFFECTION OF THE EYE IN LEUKÆMIA

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Ocular complications in leukæmia are common and have been described many times but some unusual features make the following case worth recording.

Mrs. S., 56 years of age, was admitted to the St. Catharines General Hospital in August, 1935, for treatment of an eye condition for which I saw her in consultation.

The history stated that in 1931 she had had her tonsils removed and that on section they showed simple chronic inflammatory change. The cervical glands were enlarged and there was a purulent nasal discharge. Two years later, in 1933, having been quite well in the interval, she vomited blood and had tarry stools, following which she received a blood transfusion. A diagnosis of duodenal ulcer was made and confirmed by x-ray. In February, 1935, she had another severe hæmorrhage, followed by a secondary anæmia, for which she was treated with iron and ammonium citrate. During the spring of 1935 she had a great deal of nasal discharge, with apparent involvement of both antra, and she complained of swelling glands on both sides of the neck. Early in July a radical antrum operation was performed on one side and an opening made into the opposite antrum. Toward the end of July what appeared to be a mild conjunctivitis developed, and, becoming gradually worse, she was again admitted to hospital.

The eyelids on both sides looked somewhat thickened and heavy and could barely be closed, giving at first the appearance of exophthalmos. On separating the lids, however, it was found that the conjunctiva was heaped up on all sides, was of a salmon pink colour and of a somewhat liver-like consistency. It overlapped the cornea all round very like a purse-string conjunctival flap, and through the 2 or 3 mm. opening in the centre the cornea could be seen lying at least 5 or 6 mm. below. No movement of the globe was possible. Attempts to draw aside the abrupt edge of this crater formed by the swollen conjunctiva were unsuccessful. The small area of cornea visible appeared dark blue in colour, with a rough surface which did not stain with fluorescein. No evidence of any muco-purulent discharge was seen nor had there been any from the first. The tension by digital pressure was 2 plus in the right eye, suggesting that the disturbance had extended into the anterior chamber interfering with the filtration angle. The left eye was soft. The patient said both eyes had been very painful for a time and it was thought perforation of the cornea had occurred in the soft eye. Vision was P.L. and good projection was found in each eye. Examination of the fundus was, of course, impossible. Bacteriological examination until now had been negative and continued so. Enlarged glands in the neck were present. The axillary and inguinal glands were not enlarged nor were the pre-auricular glands. All local treatment was discontinued except irrigation with normal salt solution and the application of a mild antiseptic ointment, and further investigation of the patient was carried out.

X-ray confirmed the previous diagnosis of duodenal ulcer. The spleen was found enlarged, reaching to the midline and down to the level of the umbilicus. Blood examination showed hgb. 78 per cent; red blood cells 5,100,000; white blood cells 19,200, lymphocytes and smudges making up 90 per cent, polymorphonuclears 10 per cent. Some of the lymphocytes appeared to be young with nuclei. There was slight variation in size of the red blood cells. Platelets appeared to be fewer than usual.

With the diagnosis of chronic lymphatic leukæmia the patient was transferred to the Toronto General Hospital, under Dr. T. A. Crowther, for x-ray treatment to her spleen and to the different groups of lymphatic glands with the supervision of Dr. Richards and Dr. Irwin. Following this the lymph glands became smaller, and the spleen decreased in size, being more than 1½ inches from the midline and its lower border was 2 inches above the umbilicus. The white blood count had fallen to 5,200 and the differential count showed 86 per cent lymphocytes which appeared to be all mature cells and 14 per cent polymorphonuclears. X-ray treatment was stopped at this stage. No very noticeable improvement had taken place in the eye condition though the conjunctival fold may have diminished slightly. She still had P.L. with good projection in each eye, and I hesitated to advise x-ray treatment to the eye. In the end the patient was allowed to go home early

in November, 1935. At this time she was feeling much better. Her cervical glands were quite small, the spleen was unchanged in size; the other glands were not enlarged. Her white blood count was 3,700; hgb. 77 per cent; red blood count 3,900,000. The differential count was: lymphocytes 77 per cent; polymorphonuclears 20 per cent; endothelials 3 per cent. At this time she had a temperature of 101°, with no apparent cause apart from her leukæmia.

On January 10th of this year she was feeling well, and the white blood cells were 5,000; very little swelling of the cervical glands; the spleen was unchanged, and no improvement in the eyes nor change in vision had occurred. She had a severe hæmorrhage on January 12th, vomiting blood and passing blood per rectum, and on January 17th developed a cerebral thrombosis, she died on January 20th.

The right eye was obtained for examination but for various reasons a complete autopsy was not made. Dr. A. E. MacDonald, of the University Laboratory, examined the specimen and sent me the following report.



"Lymphocytic leukæmia infiltration of the bulbar conjunctiva and cornea: obstructive glaucoma.

"*Gross.*—Cornea partly cloudy. Heavy pale yellow masses in the limbus 12 x 6 mm., extending half way round the globe, less marked below. Measures 25 x 24.5 x 25 mm. On opening, interior of globe and vitreous clear.

"*Microscopic.*—The corneal epithelium is present but very irregular and markedly swollen. There is a very intense infiltration in all the outer layers of the cornea which has apparently destroyed Bowman's membrane. The inner layers show only a few leucocytes. In the limbus region heavily infiltrated masses overlap the cornea, still maintaining their covering of epithelium. The type of cell is a small round cell with dense staining with little cytoplasm. The episcleral tissue is similarly infiltrated to the region of the optic nerve. The filtration angles are blocked by an early anterior peripheral synechia with pigment masses in the false angle. The iris and ciliary bodies are moderately infiltrated with mononuclear lymphocytes, and similar cells are seen throughout the uveal tract. The retina shows similar infiltration in a still lighter degree. The capsule of the lens is intact. The central part of the lens stains more bluish than usual, and finely stippled globular masses are seen in the region of the adult peri-nucleus."

A review of the literature was made. Meller[1] describes a slight swelling of the conjunctiva in one quadrant. Hudson,[2] in his very complete report of a case, says the conjunctival epithelium is thickened and in places œdematous, while at other points are small cystic cavities. The cornea was normal. Cohen[3] describes in his case an extremely pale palpebral conjunction, otherwise external examination was normal, also the cornea was normal. Borgeson and Wagener[4] report a study of 138 cases of leukæmia of which 59 were of the lymphatic type. In this group they found one case with slight ptosis of the upper lid, 2 cases with inequality of the palpebral fissures, the exact cause of which is not stated, and one case with subconjunctival hæmorrhages. In one of their cases hypertrophy of accessory lachrymal glands occurred, and later proptosis of this eye developed, probably due to lymphoma of the orbit.

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EXPERIMENTAL AORTIC ATHEROSCLEROSIS. — F. R. Menne, J. A. P. Beeman and D. H. Labby have studied the deposition of cholesterol in the aorta as the result of feeding cholesterol, either dissolved in oil or free, to rabbits. In the aorta of a normal rabbit receiving over 100 grams of cholesterol they found extensive subintimal deposits of cholesterol distributed according to the usual occurrence of such lesions in man and animals, together with a high blood cholesterol content and the deposition of cholesterol in other organs. In thyroidectomized rabbits and in intact rabbits receiving iodine to depress the thyroid function similar changes were found in less time and with the administration of less cholesterol (up to 92 grams), along with reduced basal metabolic rates and a high content of cholesterol in the blood. In rabbits receiving up to 147 grams of cholesterol, but given in addition desiccated thyroid to produce hyperthyroidism and a raised basal metabolic rate, deposition of cholesterol was less frequent and less extensive in the aorta and in other organs, and the blood cholesterol tended to remain normal. The theoretical implications of these results and the possible mechanism of cholesterol deposition in the aorta are discussed. The authors consider that their results support the view that the two primary conditions necessary to the development of atherosclerosis are an excess of cholesterol or its esters in the blood and stress due to mechanical factors affecting the circulation. —*Arch. Pathol.*, November, 1937, p. 612. Abs. in *Brit. M. J.*

Clinical and Laboratory Notes

AMŒBIC DYSENTERY: METHODS OF DIAGNOSIS

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It is a well established fact that amœbiasis is becoming a clinical and public health problem in Canada. Immigration from foreign countries, returned travelers, dietary fads, with the increased use of raw foods, as well as belated diagnosis, all tend to increase the incidence of the disease in this country. The sooner the practising physician becomes familiar with the natural history of this infection and learns the proper methods of diagnosis, the easier will the disease be controlled.

The digestive tract is the portal of entry of amœbæ. Encystment, according to Hegner,[1] takes place in the small intestine. The amœbæ then penetrate between the epithelial cells and the basement membrane into the depth of the intestinal glands, where lysis and displacement of epithelium results. The submucosa is gradually invaded (Fig. 1) and secondary infection gradually extends the ulcerations over the lower intestinal tract.

If the secondary infection is mild the symptoms of dysentery are practically nil, and the disease may be arrested within a short time with the proper treatment. The lesions in such cases show characteristic changes due to lysis by the amœbæ and practically no tissue reaction. Through the sigmoidoscope one may notice

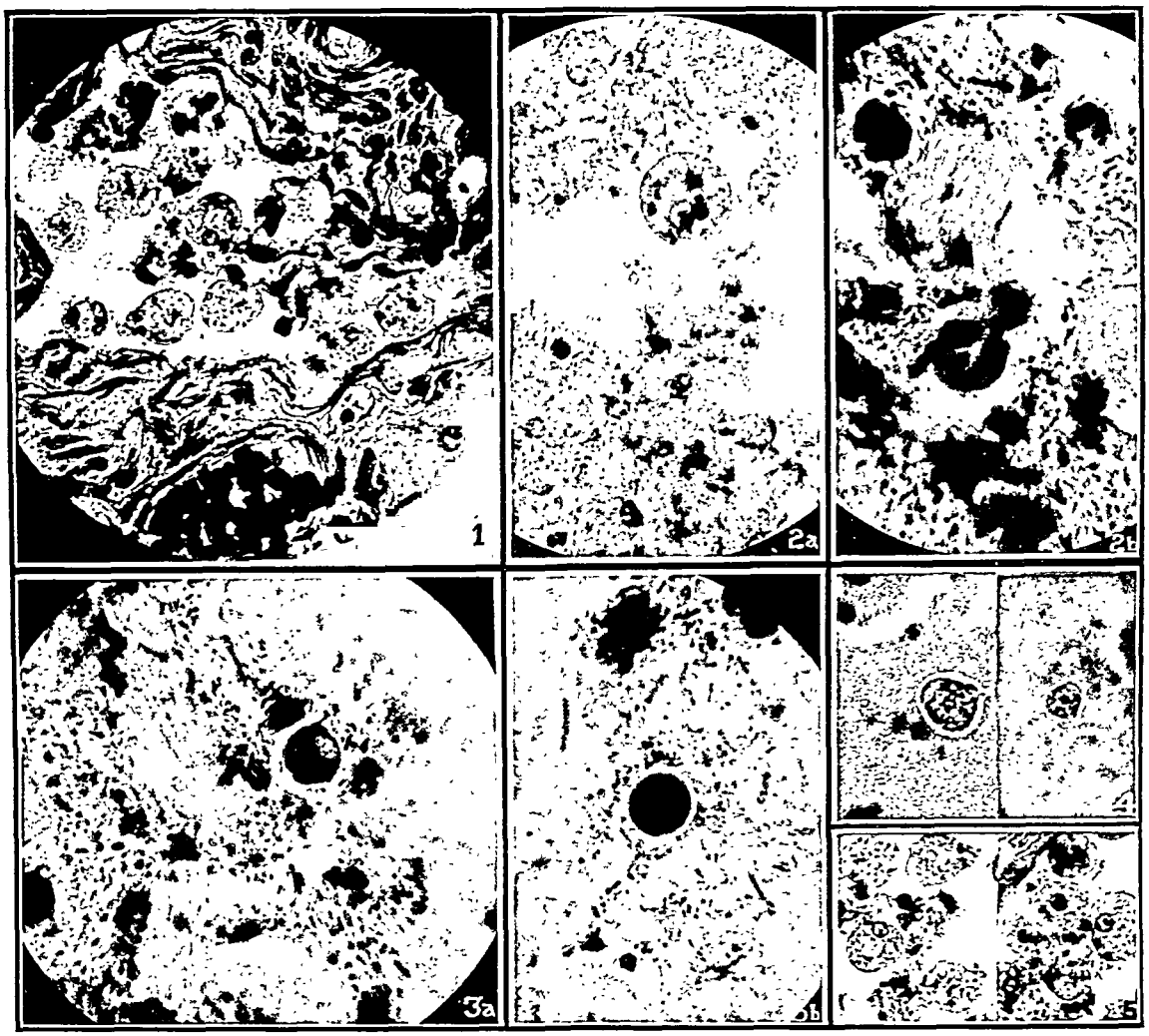


Fig. 1.—Submucosa invaded with *E. histolytica.* Figs. 2a and 2b.—Fæces: trophozoites and cysts, *E. histolytica.* Figs. 3a and 3b.—Fæces: precystic and cystic stages, *E. histolytica.* Fig. 4.—Fresh preparation. Microphotograph of amœbæ while in motion. Fig. 5.—Twenty-four culture: trophozoites, *E. histolytica.*

shallow depressions with overhanging edges and slightly dull bases. The margin is usually paler than the normal colour of the surrounding mucosa.

When severe symptoms are present they are due not to the amœbæ but to advanced secondary invasion. Through the sigmoidoscope, in such cases, in the colon where areas of invasion are more abundant severe tissue reactions extending over large areas are noted.

The amœbic exudate (Figs. 2 and 3) as seen in the fæces is very characteristic. Degenerated tissue cells, red blood cells, and some leukocytes are discharged with the amœbæ. These tissue cells show very typical lytic changes, consisting only of nuclei with very little or no cytoplasm to surround them. These so-called "pyknotic bodies" alone are sufficient to excite suspicion of amœbic infection. Charcot-Leyden crystals and the clumping of poorly stained red blood cells add to the picture. The trophozoites (Fig. 4), motile and non-motile, will be found after a careful search.

Between the exacerbations the presence of masses of exudate in the crevices of solid stool is an indication of the existence of ulcerations. Trophozoites in such stools will be found in small number or none at all. The precystic and cystic forms (Fig. 3) are usually found in small numbers, and it is often necessary to use the concentration method to arrive at the diagnosis.

The methods generally adopted for the diagnosis of amœbic dysentery are the following.

For the physician who has no laboratory.—

1. Smear thinly *fresh* fæces on cleaned flamed slides over a surface length of 1¼ inches.
2. Without drying, immerse slides in Schaudinn's fixing fluid over night.
3. Immerse slides in 70 per cent alcohol to which enough iodine has been added to give it a port-wine colour.
4. Immerse slides in 70 per cent alcohol.
5. Send to a laboratory where the iron hæmatoxylin stain will be completed and diagnosis made by a competent protozoologist.

For laboratory workers.—

(Simple method).—1. Mix a drop of *freshly passed* fæces with a drop of saline solution and place a coverglass over the film.
2. Examine for motile trophozoites and cysts. Note the cytology.

(Stained preparation).—1. Fix smears (before drying) in Schaudinn's solution heated to a temperature of 60° C. for 2 minutes.
2. Immerse smears in 70 per cent alcohol which contains iodine enough to be of port-wine colour 2 hours or longer.
3. Immerse slides in 70 and 50 per cent alcohol, in each for 2 minutes.
4. Immerse in 2 per cent aqueous iron-alum solution at 40° C. for 2 minutes.
5. Wash in running water 3 minutes.
6. Stain in 0.5 per cent aqueous hæmatoxylin for 2 minutes.
7. Wash in running water for 2 minutes.
8. Differentiate in cold aqueous iron-alum solution.
9. Wash in running water 10 minutes.
10. Immerse smears for 2 minutes each of graded alcohols: 70, 80, 90 per cent and absolute.
11. Clear in xylol.
12. Mount in xylol-balsam.

The DeRivas concentration method for cysts.[2]*—*

1. Place about 1 to 2 grams of formed or semi-formed stool in a centrifuge tube containing 5 c.c. of 2 per cent acetic acid aqueous solution.
2. Shake well, to mix thoroughly. Let stand for several seconds, for the lumps to settle.
3. Transfer the supernatant fluid to a clean centrifuge.
4. Add 5 to 8 c.c. of 2 per cent acetic acid solution. Mix.
5. Add about 2 to 4 c.c. of ether. Shake well, to emulsify.
6. Centrifuge for about 30 seconds.
7. With a pointed applicator separate the upper layer of fæcal material from the wall of the tube, and then empty the tube completely by turning upside down.
8. With the aid of a capillary pipette collect the sediment at the very bottom of the tube and transfer to clean slides.
9. Examine under the microscope for cysts.
10. Make stained preparations. Only cystic and precystic amœbæ will be found by this method.

Cultivation of amœbæ.—

During the follow up period, which should be at least at two-week intervals for a period of 3 months or longer, cultures have been found of great value (Fig. 5).

1. The fæces should be as fresh as possible.
2. A particle of fæces, the size of a pea, or about 0.5 c.c. of liquid stool, is mixed with the liquid portion of the media.
3. Place in the incubator at 37° C.
4. Examine the *sediment* (with the aid of a capillary pippette having large bore) at the end of 24 hours.
5. Examine at least 3 to 4 preparations before considering the sample negative.
6. If negative in 24 hours, replace in the incubator, to be examined in 48 hours.

The Boeck and Drbohlav or Dobell and Laidlaw media are the best. Any single medium, however, in experienced hands will give results. It is therefore advisable to select one and use it to gain experience. I obtain very good results with the following very simple medium.

Prepare slants of:

1. Inactivated serum (Wassermann-negative), 3 parts.
2. Sodium chloride solution (0.85 per cent) 1 part.
3. Inspissate in incubator.

Overlay with:

4. Sterile inactivated human serum 1 part and
5. Sodium chloride solution 6 parts.

Serological diagnosis.—The complement fixation is the method of choice in chronic infections where involvement of the liver is suspected. Craig[3] has definitely established the changes in the human tissues produced by amœbic infection and thus added the complement fixation to the methods of diagnosis. It is very useful as a control of the efficiency of treatment. The antigen used is an alcoholic extract of cultures of *E. histolytica* or of mucoid material rich in

amœbæ obtained from the intestines of infected dogs. The technique of the test is of that recommended for the Wassermann test, and those interested may refer to a very interesting monograph entitled "Amœbiasis and Amœbic Dysentery", Charles C. Thomas, Springfield, Ill.

CONCLUSIONS

1. The earlier the diagnosis of amœbic dysentery, the quicker the therapeutic effect.
2. The various methods of diagnosis are given.
3. Microphotographs of fresh preparations, stained preparations, cultures, and sections showing the forms of amœbæ are given.

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Therapeutics and Pharmacology

METHOD OF ADMINISTRATION OF ANTIPNEUMOCOCCIC SERUM

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The value of serum in pneumonia has been well established, but there has been difficulty in devising a satisfactory method of administration.

The problems presented are largely associated with serum reactions. These reactions can be one of three types. First, immediate or anaphylactic; second, thermal; third, delayed. Needless to say, these problems are very disconcerting to the physician. It was felt that before the administration of antiserum in relatively mild though early cases of pneumonia was justified a method of administration by which serum reactions could be largely eliminated must be devised.

In giving the serum, three general principles have been laid down consistently. First, give the serum slowly; second, have adrenalin ready for use in case of shock; third, give adequate doses of serum (in every case at least 50,000 units). It is also generally agreed that many pneumonia patients require stimulation of the peripheral vascular system. It naturally followed that, to accomplish both ends, a routine small dose of adrenalin might be given with each administration, thus counteracting in advance any possible reaction. In order to give the serums slowly, it might readily be given intravenously with saline, to which, should the patient's condition suggest it, glucose might be added. The method of administration used is as follows: adrenalin, m.v, given immediately before the intravenous injection of 20,000 units of serum in 200 c.c. of saline. This is given over a period of one hour and the adrenalin is repeated in the last half of the solution. The results obtained are rather remarkable, in that practically all serum reactions are eliminated.

THE TREATMENT OF ACNE

BY D. E. H. CLEVELAND

Vancouver

Treatment may be divided under the headings of (1) local hygiene; (2) general hygiene; (3) local treatment; (4) diet, and (5) general treatment.

1. *Local hygiene.*—Commence with the scalp. A scurfy, oily, neglected scalp is a log across the road. Shampoo with tincture of green soap (it must be properly made with the best ingredients, else it will not lather but make only a sticky mess in the hair) and warm water once weekly. Use a soft nail-brush for boys and men, a tooth-brush or plate-brush for others, taking adequate time and thoroughly rinsing with running water. Remember it is the scalp and not the hair that needs washing. If after several weeks of this the scalp does not remain free from scurf and excessive oil an alcoholic lotion containing 2 per cent salicylic acid or mono-acetate of resorcin, with 10 per cent oil of cade if there is itching, may be rubbed in three to five times weekly. Greasy dressings and "oil treatments" are forbidden.

On rising and at retiring give the face a brisk friction with a rich and very hot lather of a non-medicated soap. Rinse with equally hot water; it is a more efficient astringent than warm or cold water. Ice or ice-water is not recommended. In exceptional cases with tough, hard, comedone-studded skin hot packs should precede the soap friction. Forcible expression of inflammatory nodules and pustules must not be attempted. Some may be trusted to use comedone-expressors intelligently and to lance superficial pustules with a Hagedorn needle.

Girls and women should be permitted to use such cosmetics as dry rouge and powder, and as "foundation" a minimum of rosewater ointment or a preparation of eucerin. All other creams, etc., are forbidden. Before washing at retiring the dry deposits of rouge and powder

should be softened by liberal use of one of the above ointments and wiped off thoroughly.

2. *General hygiene.*—Baths may be as frequent as desired, but not hot or prolonged. Steam-baths, commonly recommended for skin troubles, are prohibited. When the skin of the back or chest is involved exercise which promotes free sweating is to be discouraged; when it entails wearing jerseys, sweat-shirts, shorts, etc., as in field-games or rowing, which commonly hang in the locker-room throughout the season, or, carrying packs, as in hiking and climbing, it is forbidden.

Adequate sleep is insisted upon. Hasty and irregular eating habits are to be checked. Erotic preoccupation and the consequent sexual stimulation may be an aggravating factor. This should be explained frankly, and the patient's cooperation in this respect thus secured. Anæmia, septic foci, and evidence of unbalanced diet resulting from diet fads should be sought for and the proper adjustments made.

3. *Local treatment.*—The standard Lotio Alba, containing a dram each of zinc sulphate and potassium sulphuret in rose water, with a little glycerin, is the most widely useful formula. Its strength may be doubled or tripled when necessary. It is generally applied morning and night, and dry rouge, if desired, may be applied over it.

A modernized Eau d'Alibour is of much use when there is much pustulation. Dilute two tablespoonfuls in a glass of hot water for sponging over the face for 5 minutes twice daily.

℞

Zinci sulphat.	5.6	ʒ i. ss
Cupri sulphat.	1.6	gr. xxiv.
Aq. Camphoris (sat. sol.) ad	240.0	ʒ vi.

Vleminckx' solution is a very useful alternative to Lotio Alba. Commencing with a dilution of a teaspoonful to a cup of hot water its strength is gradually increased; it is used like the preceding formula.

℞

Calcii oxidi	15.0	ʒ iv.
Sulph. præcip.	30.0	ʒ i.
Aquæ dest. ad	300.0	ʒ x.

(Boil down to 180.0 – ʒ vi and filter).

These two solutions have the advantage of being clear without insoluble precipitate.

For mild acne with oily skins the following astringent and drying lotion is useful and agreeable, used like Lotio Alba:

℞

Sod. biborat.	10.0	gr. clx.
Zinci oxidi Pulv. Amyli aa	15.0	ʒ iv.
Aq. Rosæ Aq. Calcis aa q.s. ad	240.0	ʒ viii.

For acne of the back and chest with seborrhœa and comedones give a daily friction with a brush, warm water and tincture of green soap, followed when dry by thorough dusting with the following:

℞

Sulph. præcip. Ac. Borici aa	15.0	ʒ iv.
Pulv. Talci	30.0	ʒ i.

An excellent alternative, especially where there is much pustulation, is brisk friction with a cotton pledget moistened with 1 per cent solution of iodin crystals in alcohol, from one to three times weekly.

In the occasional case with tough, greasy comedone-laden skin the steam-packs are followed by a strong peeling lotion:

℞

Resorcini	1.2 – 7.2	gr. xx – ʒ ii.
Sulph. præcip.	5.0 – 12.0	ʒ i gr. xx – ʒ iv gr. xx.
P. Talci Zinc. oxidi Ac. Borici Glycerini Alcohol aa q.s. ad	120.0	ʒ iv.

This is to be massaged in at night and steamed off in the morning.

With these astringents and peeling applications, the frequency of use and concentration is controlled by the patient's tolerance, which usually increases rapidly. It is occasionally necessary to interrupt their use for a day or two, and even to soothe the skin with a bland ointment such as 10 per cent boric acid in rose-water ointment. In general greasy applications should be avoided as far as possible. Ultra-violet radiation is not to be relied upon; its best effects are but temporary. Roentgen-rays are sometimes essential, but their use should be in the hands of a dermatologist, who possesses not only the necessary apparatus but a full understanding of the condition he is treating.

4. *Diet.*—A drastic reduction in carbohydrates and fats, especially in the active and growing youth, is undesirable and unnecessary. The following foods are to be avoided in all cases: chocolate, as a beverage or confection: tea and coffee, unless weak and at moderate temperature; alcohol and carbonated beverages: *cooked* fats, *e.g.*, rich soups, gravies and sauces entrees, fried foods, pastry, rich cakes and puddings; pork; domestic goose and duck; preserved meats and fish; cheese, except cottage cheese; condiments, except salt (not iodized); *e.g.*, spices, pickles, relishes, etc., mayonnaise and boiled salad dressings; bakers' white bread, rolls, etc.; nuts. In some cases where there is known intolerance of iodine it may be necessary to forbid fish and other sea-foods.

5. *General treatment.*—The disease is not caused by bacteria, hence staphylococcus toxoid, autogenous vaccines, etc., are of very limited, if any, use. A stock acne vaccine in properly selected cases may be of decided value. En-

docrine products have not as yet been found of any definite value in the experience of any large and important number of clinical investigators. The various nostrums offered as "blood-purifiers", including laxatives, yeast in various guises, bitter stomachics and iodides, are mentioned, with some apology, only to be condemned. There is no specific for acne, whether a local medication, form of physical therapy, diet, oral or parenteral remedy.

Editorial

OUR ASSOCIATION

IT is seventeen years since our Association met in Halifax in annual convention. Much water has flowed under the bridge since that time. In 1921 the fortunes of the Association were at a low ebb. We were in debt, the membership was dwindling, and the spirit of pessimism seemed rife. However, there were some chosen souls, endowed with courage and hope, who were resolved that the Association should not die. A special committee brought in resolutions which were in substance adopted by the Association at Halifax, and we took on a new lease of life. What we are today is largely due to the business sense and the foresight of the men of 1921.

What were these resolutions? In the main, as follows. The annual fee was to be raised from $5.00 to $10.00; it was found that the publishing of the *Journal* alone cost more than the former fee, leaving nothing for other important activities of the Association. It was obvious that with a deficit from this cause the Association could not carry on. Also, the *Journal* was to be enlarged; it was to record the news of the various provinces and air their views; it was to help unify the medical profession from coast to coast, *to cultivate a national rather than a provincial outlook;* it was to bring the knowledge of all that is best in Medicine to the attention of the general public; it was to be the medium by which the work of Canadian medical men was to be brought before the world. It was proposed to buy out the publishers, and to this end a bond issue of $20,000 was authorized and promptly taken up. It is noteworthy that in a very few years the amount was repaid. Next, there was to be a whole-time paid secretary. Dr. T. C. Routley was appointed, and we need not dwell on how successfully this move has turned out. Energy, guidance and publicity are words which may properly be applied to his work for the Association. If we take stock today we must agree that the plans initiated at the Halifax meeting of 1921 were wise and far-reaching, and have been followed by the good results that all hoped for. The work of the Association has expanded in many directions. We need only mention some of the matters that are now being dealt with — Health Insurance; a more comprehensive Health Program for the Dominion; Group Health Insurance; the Medical Care of the Indigent; Hospital Service; Maternal Mortality; Cancer; Post-graduate Instruction; the Regulation of Specialism; the Radio-Broadcasting of medical and pseudo-medical information; Nutrition; Publicity and Health Education; and Ethics.

The Association has fostered the formation of special Sections which function at the Annual Meetings. So far as its resources will allow it has encouraged research on the part of young medical graduates. It has initiated and is planning for the establishment of a society, both lay and medical, to combat cancer. It has fathered other movements that are now going strong, as the Royal College of Physicians and Surgeons of Canada and the Canadian Medical Protective Association. It has established the Osler and Lister Orations and the Blackader Lectures. Surely, an excellent record of accomplishment! Matters, too, which are of importance to all the practitioners of the land.

What of the Halifax meeting of 1938? Will it prove as fruitful as its predecessor? We hope so, of course; there are still things to be done. First and foremost, there is the question of Federation. It is not necessary to go again into the merits of a closer union of the provincial medical associations with

one another in the bond of the national Association. The principle of this has already been almost universally approved. It certainly was in the minds of the men of 1921. It is, perhaps, too much to hope that the plan which we have so much at heart will be finally consummated at Halifax; there are difficulties still in the way. But we can feel assured that the project will be advanced a step or two farther. Perhaps this meeting at Halifax in June will also prove momentous. In the hope of this let us all rally around our Maritime brethren. The Convention is sure to prove a delightful occasion. Finally, we appeal to all of our confrères who are not members of the Association to join at once. *L'union fait la force.* And, ON TO HALIFAX. A.G.N.

THE EARLY ADMINISTRATION OF ANTISERA IN PNEUMOCOCCUS PNEUMONIA

IN a recent editorial in this *Journal*[1] attention was drawn to the introduction of anti-pneumococcus *rabbit* serum in the treatment of pneumococcus pneumonia and to the success obtained by its use in a small series of cases of infection with types I, II, VII and VIII. The favourable results achieved with types I and II concentrated horse antiserum in the report of the Massachusetts' pneumonia study was also pointed out.

The present purpose is to stress the advantage of early administration of serum (within 24 hours of the onset of the disease). Thus Cole[2] had no death in 47 cases of type I pneumonia so treated and Cecil[3] in a collection of 160 type I cases, including 37 of his own and those of Heffron, Bullowa and Rogers, reports a mortality of only 5 per cent. In all the above instances concentrated horse antiserum was given early. Rapid diagnosis of type is readily made by the Neufeld technique, which is absolutely reliable if the sputum has not stood more than two hours, and all of the various sera for specific typing are now available commercially. For performing the test a fixed smear of sputum is first stained to demonstrate the presence of Gram-positive diplococci. A small fleck is then transferred to a clean coverslip. A drop of diagnostic serum is added, the two well mixed, and one small drop of methylene blue stirred in. The cover slip is rimmed with vaseline and inverted on a glass slide. It is examined with the high dry or oil-immersion lens of the microscope, and after an interval of a few minutes to a half hour a definitely outlined swollen capsule is seen around the organism if they are of the same type as the serum being used in the particular test. To expedite matters mixtures of several types of sera are being marketed so that in a single test it is possible to rule out the presence of a number of types. If one is merely interested in the purely practical rather than in the academic side of the question he need only test for those types for which therapeutic serum is available and from time to time add others as their sera become available for therapy. At present only sera of types I, II, III, V, VI, VII, VIII and XIV have been announced as ready for therapeutic use.

With regard to the incidence of the higher types of pneumococci more information is now at hand in publications from the United States. Finland *et al.*[4] have typed 3,682 specimens, mostly from sputum, and found representatives of all types with V, VII, VIII, X, XIV and XX occurring most frequently. They have also reported 160 cases of type VII pneumonia, 30 of which were serum-treated. In the treated group 10 per cent died, whereas 38 per cent of the 130 untreated succumbed. Mention has previously been made of the 125 type VIII cases already reported by Finland and Sutcliff. Rosenblüth and Block[5] have added 68 type V pneumonias, and Benjamin and his associates[6] 485 completely typed cases

1. BRANCH, A.: Editorial, *Canad. M. Ass. J.*, 1938, **38**: 273.
2. COLE, R.: *Milit. Surg.*, 1937, **81**: 241.
3. CECIL, R. L.: *J. Am. M. Ass.*, 1937, **108**: 689.
4. FINLAND, M. *et al.*: *Ann. Int. Med.*, 1937, **10**: 1531. *Idem: Am. J. M. Sc.*, 1937, **193**: 59.
5. ROSENBLUTH, M. B. AND BLOCK, M.: *Arch. Int. Med.*, 1937, **60**: 567.
6. BENJAMIN, J. E. *et al*: *Ann. Int. Med.*, 1937, **11**: 437.

with V, VII, and VIII preponderating. Layne and Reimann's[7] 277 cases show figures not unlike those of Finland, except that types IV, VI and XVI are more frequent than X, XIV and XX. They also include a composite chart with the incidence shown in various states and also in Germany and China. Heathman *et al.*,[8] in a paper entitled "Pneumonia in Minnesota, what can be done about it?" estimate, from the reduced mortality in serum treated cases quoted above, that 360 per 1,000 deaths might be avoided if typing services and therapeutic sera were available. The Health Commissioner of New York City, Dr. J. L. Rice,[9] commenting on the 6,505 deaths from pneumonia in that city for the year 1937 stated that he anticipated a reduction in the death rate since the newly established pneumonia program had been initiated. All boroughs now have typing stations, that in Manhattan giving a 24-hour service, including Sundays and holidays. His department also had available sera from the five or six most prevalent types.

The only Canadian figures so far published are those of Brown and Anderson[10] on 397 cultures from children at the Hospital for Sick Children, Toronto. The majority were acute pneumonias with approximately a third from other sources. Their type incidence is as follows: I, V, III, VII, XIX, XXVI, XIV, IV and VI, with others less numerous.

It seems a likely premise that the Canadian figures for adults would not differ widely from those reported in the United States, and that our pneumococcus infections would respond equally well to serum therapy. This being the case it would be possible to prevent a fair percentage of the 9,000 pneumonia deaths occurring yearly in this Dominion, particularly as pneumococcus *broncho-pneumonias* are also amenable to serum therapy (Nissen). In the United States besides Massachusetts, several other states, *i.e.*, New York, Michigan and Connecticut, are now offering a diagnostic typing service as well as supplying free serum for treatment, and aid is being given by other agencies and insurance companies. Why may not we in Canada have something of the same effort applied to taking the sting from this perennial reaper of useful lives?

ARNOLD BRANCH

7. LAYNE, J. A. AND REIMANN, H. A.: *Minn. Med.*, 1937, **20**: 3.
8. HEATHMAN, L. S. *et al*: *Minn. Med.*, 1937, **20**: 1.
9. RICE, J. L.: Quoted in *Brit. M. J.*, 1938, **1**: 182.
10. BROWN, H. M. AND ANDERSON, E. A.: *Canad. Pub. Health J.*, 1938, **29**: 35.

THE MEDICAL WITNESS

THE importance of medico-legal evidence need not be stressed. But it is a type of evidence which is subject to considerable variation in quality, and it is useful to have the point of view of the lawyer regarding it. A recent address by Mr. A. E. Jalland, an English barrister, is therefore of some interest.*

Mr. Jalland begins by quoting the downright opinion of one lawyer that medical men are amongst the most unreliable witnesses in court. This charge may be exaggerated, he points out, but there still is an evident need for improving the mutual understanding between the two professions. He complains that most medical men distrust the legal profession, and regard time spent in the law-courts as wasted. That feeling should not prevail. To serve the ends of justice is as noble and essential as to treat the sick. For law keeps civilized society together: "When Justice dies," says an old writer, "let the world be made a bonfire". (Terrible words in these our days!) If this were fully realized medical men might feel less reluctance in giving their time in the law courts. Besides, there is often great interest in trying to establish the truth, for, as Sir Henry French has said, "The sparks of all the sciences in the world are raked over in the ashes of the law."

Sometimes the medical witness is inclined to mistrust his judgment and to be shy about giving evidence. On the other hand he may err in being too certain. The cure for either extreme is patience, which will

* "The Medical Witness": *The Medico-Legal Review*, 1938, **6**: 64.

eventually lead both types of minds into the way of truth.

Another common fault is in the method of expression. Mr. Jalland thinks that as a general rule medical men are poor speakers. He would have them try to improve this by speaking slowly, and only after thinking over their answers. This obscurity of expression is especially evident in the "appalling" handwriting of the average medical man. This time-honoured exaggeration permits him to tell a story about the Duke of Wellington who once received a letter from an authoress, Jane Loudon, in which she asked permission to sketch the famous "Waterloo Beeches" on Wellington's estate. "Her writing," says Mr. Jalland, "was nearly as bad as that of a doctor, and as a result the Duke wrote to the Bishop of London saying that the breeches which he wore at Waterloo were in no way remarkable, but that the Bishop was at liberty to make a sketch of them if they could be found."

A more serious fault perhaps lies in the use of obscure terms. A black eye, for example, should be so designated, and not referred to as a contusion with extravasation of blood and ecchymosis. Mr. Jalland thinks that in their love of technical terms doctors resemble gardeners, with the difference that gardeners can be persuaded to use simple terms. We feel that Mr. Jalland has "got something here" It is not only that the technical terms of medicine confuse the lay mind; they sometimes carry with them an air of superiority, which is irritating.

Mr. Jalland gives many useful suggestions, such as the value of taking notes, the avoidance of exaggeration, the cultivation of observation in suspicious cases, the getting to know something about the work of the courts. And it is reassuring to find he admits that lawyers too have their idiosyncrasies.

H.E.M.

Editorial Comments

The Meyers Memorial Prize

Attention of our readers is directed to the fact that under the will of the late Dr. Campbell Meyers, the sum of one hundred dollars is available every year for that member or guest of the Canadian or Provincial Medical Associations who "shall write and read at the Annual Meeting of any of these Associations the best thesis or dissertation on the study and treatment of those functional neuroses which, if untreated, or not treated sufficiently early, might probably terminate in insanity."

Very few attempts have been made to win this prize. It may be that the choice of topic is somewhat narrowly restricted under the terms of Dr. Meyers' will. He had in mind the important practical consideration that time should not be wasted on the subject of declared insanity but, rather, that attention should be given to those cases in which the patients, hampered perhaps by heredity and environment, could by suitable treatment be restored to normality and be prevented from drifting into actual insanity. His object was entirely humanitarian. It should not be hastily concluded that only those engaged in psychology and psychiatry can engage in this task. The general practitioner is the one who sees these particular cases early, and he could make a valuable contribution to our knowledge of these neuroses and psychoses, by recording his experiences and his ideas about treatment.

In bequeathing the sum of $100.00 per year, for a period of twenty-five years, to the Canadian Medical Association—the bequest to be known as the Meyers Memorial—the late Dr. D. Campbell Meyers designates the nature of the memorial in the following, as extracted from his will, and further supplemented in a letter under date February 27, 1927.

"As I desire to perpetuate the study of the prevention of insanity in certain of its types, to which my life has been largely devoted, and as I believe the treatment of this phase of nervous disease belongs to the general physician and the neurologist, I direct my Trustees to pay to the President of the Canadian Medical Association the annual sum of one hundred dollars, for a period of twenty-five years only, to provide an honorarium to be known as The Meyers Memorial, to be awarded by the Committee consisting of the President, a physician and a neurologist, (the latter two to be chosen by the President), to such member or guest of the Canadian or Provincial Medical Associations as shall write and read at the annual meeting of any of the said Associations the best thesis or dissertation on the study and treatment of those functional neuroses which, if untreated, or not treated sufficiently early, might probably terminate in insanity, in the hope that the further study of those neuroses will lead to the formation of specially equipped wards in General Hospitals, devoted to their study and early treatment, and more especially in those hospitals where teaching to the medical student as well as the nurse is given, such theses to be submitted to and adjudged by the above Committee. Should no thesis of sufficient merit in the opinion of the Committee be read at the annual meeting of the Association the said grant shall not be made for that year by my Trustees. I desire that my good friend, General John T. Fotherington, M.D., shall be appointed

the first physician, and Dr. George F. Boyer the first neurologist on the said Committee, and that they shall continue thereon as long as they desire to act."

FURTHER NOTES ON THE FUNCTIONAL NEUROSES AS MENTIONED IN MY WILL

"As the present nomenclature of both functional nervous and mental disease is more or less transitory and may change materially in the next few years, it is impossible to classify definitely the type of disease referred to above. I desire, however, to refer to those functional neuroses in which the psychological symptoms form the essential part of the syndrome, and to that type of neuroses which develops in late adolescent or in adult life in a patient of previous good mental and nervous history, especially such neuroses as has its etiology in emotional overstrain caused by excessive grief, worry, and allied conditions to which modern life is so conducive, and which, when the present illness is successfully overcome, will enable the patient to at once return to his normal life as a good and useful citizen, and thus avert any of those persistent mental symptoms which so frequently remain as a result of a period of insanity.

"I desire to exclude from this thesis the study of mental defectives, paranoia, and similar conditions of mental disease due to hereditary or organic states, since the treatment of these conditions, however meritorious it may be from a humanitarian point of view, will not, I believe, remove the abnormal mental state of these individuals. Hence the best interests of the State will be obtained by the restoration to their normal health of those individuals who previous to their illness were fully efficient as citizens."

Dated this 7th day of February, A.D., 1927.

(Signed) D. CAMPBELL MEYERS.

It is hoped by the Committee in charge of the Meyers Memorial that members of the profession will become interested and will cooperate by way of contributions on this important field of endeavour to the program of our Annual Meetings. A.G.N.

Tubercle—a Journal of Diseases of the Chest

A new format has been adopted by *Tubercle* published in London. This journal has been enlarged and is developing a bibliography and abstract sections which should be of considerable value in following the literature on tuberculosis. The February number opens with a paper by Dr. Madge Thurlow Macklin on "Tuberculosis in hospital workers" which brings out some extremely interesting facts. We hope to comment on these later on. H.E.M.

Corrigendum

Dr. Stuart Gordon writes us in reference to the method for the treatment of malar fractures to which he refers in his article entitled "The Immediate Treatment of Facial Fractures" which appeared in the *Journal* for November, 1937, page 440. He regrets that, through inadvertence, the method was credited to Gillies: it should have been credited to Gillies and Kilner.

Retrospect

THE APPLIED PHYSIOLOGY OF THE THYROID GLAND

BY J. E. PLUNKETT, PHM.B., M.D., C.M., F.R.C.P.(C.)

Ottawa

The thyroid gland is composed of a very large number of functioning units, the follicles, strung together much like a bunch of grapes. The essential cells of the thyroid line the acini. These acini in the normal gland are lined with cuboidal epithelial cells attached to a basement membrane and held together by interstitial tissues in which run the vascular and lymph channels. The epithelial cells lining the acini are unique, in that they are bipolar, that is, they may secrete in either of two directions, into the interior of the acini or into the vascular channels. As Boyd so well puts it, "They have both a back and a front door". Secretion into the acinus may be considered as a process of storage, a provision for a time of greater need; while secretion in the reverse direction may be looked upon as meeting the current needs of the tissues.

In the colloid which is secreted into the acini there are two protein bodies: (1) a nucleoprotein which contains no iodine but is high in phosphorus. This fraction has no known function; (2) thyroglobulin, which is rich in iodine and from the molecule of which the essential thyroid hormone is probably split off as required.

The thyroid builds thyroglobulin when it is supplied with (1) iodine and (2) essential amino-acids. Under normal circumstances there is an approximate balance between the formation and release of hormone. The demand of the tissues for thyroid hormone varies with age, sex and season, and is increased by many physiological and pathological processes such as pregnancy, menstruation and infections. The ability of the gland to supply increased amounts of hormone to meet an increased demand depends partly on an adequate supply of: (1) essential amino-acid, especially tyrosine, or protein from which it may be formed. That deficiency of protein or amino-acid may handicap the gland is possible, but probably of extremely infrequent occurrence. (2) Adequate available iodine. This is a factor of great variability, both in regard to the amounts present in the diet and in the conditions which affect its absorption. Dietary iodine is highest along oceanic shores and in districts where oceanic moisture is precipitated. It is low in inland and mountainous country districts and

particularly in regions where the iodine has been leeched out of the soil by glaciers. However, to be useful, iodine must not only be present but also available for absorption. In this respect other dietary elements assume great importance—thus the close relationship which exists between the so-called goitre districts and the geographic variability in limestone deposits. Other modifying factors are the fats and phosphorus in the diet, and especially the calcium phosphorus ratio and the pH of the intestinal contents. Bacteria in the water and in the intestinal canal may also play some part.

An inadequate supply of raw material will lead to a compensatory hypertrophy of the gland, which may be compared to a work hypertrophy as seen in other tissues. This inadequacy of supply may also be absolute or only relative, as when associated with any increased demands for the finished thyroid product, for example, in pregnancy or lactation.

The formation and release of thyroid hormone is subject to a nicely balanced self-governing control. When the hormone supply is insufficient to meet the needs of the tissues certain physiological processes are set to work. Apparently this is so irrespective of whether the lack be due to decreased supply of hormone or increased requirements of the tissues. In the chain of physiological processes which lead to increased thyroid stimulation the rôle of the anterior pituitary is becoming increasingly realized. Uhlenhuth, of Baltimore, had produced very suggestive experimental evidence of this as long ago as 1926, and has added an imposing array of evidence along the same line since then. Collip has also contributed much in this field.

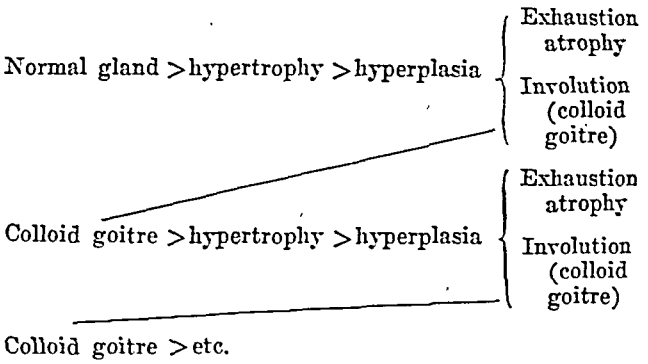
A. *Tissues.*—Thyroxine deficiency may exist because of: (1) decreased thyroxin formation, *e.g.,* scarcity of raw material such as iodine; (2) increased demand by the tissues, *e.g.,* puberty, menstruation, pregnancy, lactation, infection; (3) interference with tissue oxidation, *e.g.,* poisoning with cyanide.

B. *The anterior pituitary gland* is stimulated to produce thyrotropic hormone which activates.

C. *The thyroid gland causes:* (1) release of colloid; (2) hyperplasia of gland, accompanied by: (*a*) increase in blood supply; (*b*) plication and infolding of epithelium; (*c*) change of cuboidal epithelium to high columnar; (*d*) decrease of iodine in the gland.

How tissue thyroxin deficiency leads to anterior pituitary activity is unknown. The effect of the anterior pituitary hormone on the thyroid gland is much better understood. The first and principal effect of the thyrotropic (thyroactivator, Uhlenhuth) pituitary hormone is to bring about a release of the colloid from the thyroid acini. The colloid rapidly disappears from the gland. The blood supply increases and the vascular channels open up. The low cuboidal epithelium changes to a high columnar type and becomes infolded and plicated, and the iodine rapidly decreases in the gland. In other words, the gland becomes hyperplastic.

Physiological compensation may occur either by (1) increased iodine supply, or (2) decreased tissue thyroxine demands, and in either case a regression takes place in the gland. The blood supply decreases, the colloid begins to reaccumulate and the iodine to increase, and the epithelium again shrinks to a low cuboidal form. Involution may be excessive, leading to colloid goitre. On the other hand, if the maximum hypertrophy fails to compensate there is danger of exhaustion occurring, with atrophy and then death of the cells. Thus there is an ebb and flow of activity in cycles which are associated with variations in the supply of iodine and in the tissue demands. Marine has represented it thus:



The final direction taken toward exhaustion or toward involution will depend, of course, on the continuation of the disproportion between iodine supply and the tissue demands, on the one hand, or on the restoration of a normal equilibrium, on the other.

We owe our knowledge of thyroid chemistry chiefly to Kendall, who was the first to isolate thyroxine, and to Harrington, who was the first to synthesize it. The former erred in considering it to be derived from tryptophane, whereas

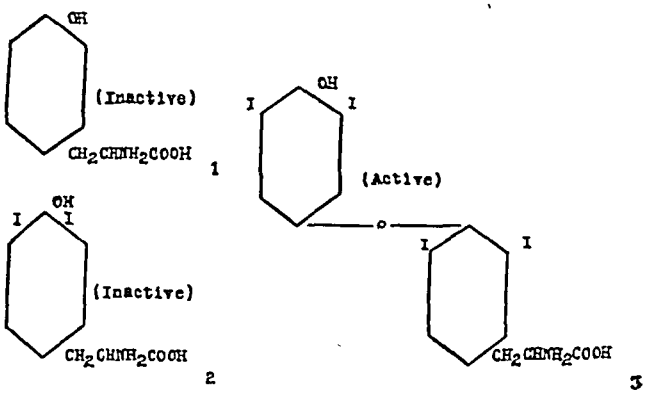


Fig. 1. — *Tyrosine* is B-hydroxy-phenol-a-amino propionic acid. **Fig. 2.**—*Diiodo-tyrosine* is formed by adding iodine in the 3:5 position. **Fig. 3.**—*Thyroxin.*

the latter showed that it could be built up from tyrosine.

Thyroglobulin consists of a very large molecule made up of thyroxin 30 to 40 per cent, and diodotyrosine in polypeptide linkage. What the natural thyroid hormone itself may be is not known. It is true that thyroxine will produce all the physiological effects of the thyroid hormone, but there is good reason to believe that the natural hormone is not thyroxine, although it undoubtedly is closely related. The surprisingly long latent period (up to 24 hours), which follows the intravenous injection of thyroxine suggests that changes are occurring in the molecule preceding its effect. In addition to this it has also been shown that the activity of the thyroid gland is proportional to its total iodine rather than to its thyroxine iodine only. Extremely small amounts of thyroxine are formed in the thyroid gland. It has been stated that 0.2 to 0.4 mg. are utilized in the human body per day under normal circumstances. Our knowledge of the variations in the iodine content of the thyroid gland, the blood and the urine, is of very recent origin, owing to the chemical difficulties involved in the respective analyses. Methods have now been worked out which allow determinations to be made with an error of less than 10 per cent.

IODINE IN THE GLAND

The normal thyroid gland contains 10 to 15 mg. of iodine, with a maximum of somewhat less than 25 mg., this being present in a proportion of about 40 mg. per cent. In hyperthyroidism this percentage is greatly reduced, falling as low as 3 mg. per cent in exophthalmic goitre.

The hyperplastic gland has a great thirst or affinity for iodine and readily picks up this element from the circulating blood. It has long been known that the administration of iodine has a controlling effect on the intoxication of hyperthyroidism, and following Plummer's reintroduction of iodine medication in 1922 a new chapter in thyroid therapeutics was opened. Plummer thought that the iodine produced its effects by preventing the formation of an abnormal (incompletely iodinized) secretion, but this conception has had to be abandoned in the light of more recent evidence.

Lerman and Salter have shown that by suitably arranging the conditions the usual cleavage effect of pepsin on protein may be reversed in such a way that the enzyme catalyses the formation of a more complex body. In this way they have been able to produce *in vitro* substances having thyroxine activity from the amino acids and iodine. They suggest that, as in enzyme actions in general, this reaction is reversible and obeys the law of mass action. By maintaining an excess of iodine in the system the reaction is made to proceed in the direction of the formation of colloid. This is illustrated in the diagram.

Enzyme + iodine + amino acids
—> thyroxin —> thyroglobulin = colloid
—> storage —>
<— release <—

This enzyme reaction is reversible and can be made to proceed in either direction according to the condition (*i.e.*, by the law of mass action). Thus, excess of iodine forces the reaction to proceed in the direction of colloid formation. The reaction proceeding in the reverse direction results in the formation and release into the blood and lymph streams of simpler breakdown products, including thyroxin.

Therefore, the essential effect of iodine administration to a hyperplastic thyroid gland is to induce the formation and storage of colloid within the acini. The result of the colloid storage is to distend the follicle. The vascular and lymph channels are pressed upon, with the effect that further hormone release is effectively blocked, at least temporarily. Later, when vascular and secretory adjustments have been made, hormone may again escape, and the iodine effect will be said to have worn off, or the gland to be "iodine fast". Means, of Boston, denies that a hyperplastic thyroid gland ever becomes "iodine fast". His argument is that the iodine improvement is continuous and that if intoxication progresses under iodine administration it would be still worse without iodine. He believes that the curve representing metabolism under iodine administration is parallel to that when iodine is not given but is at a constantly lower level. He has constructed graphs representing the falling basal metabolism in cases of exophthalmic goitre under treatment with iodine. These have the same slope and direction and can indeed by superimposed on the curve of thyroxin decay. The latter is found in a totally myxœdematous person maintained at a higher metabolic rate by thyroid administration and in whom the administration is stopped. It represents the gradual drop in metabolism as the circulating hormone is used up. Since the curve of iodinization is similar it suggests that the effect of iodine is to produce a physiological block in the gland, thus preventing further escape of hormone. It should be mentioned here, also, that excess of iodine administration may lead to atrophy of cells in the gland (pressure?) which may be followed by fibrous replacement and scarring (iodine thyroiditis).

THE BLOOD IODINE

The abnormal thirst of the hyperplastic gland for iodine has been made the basis of an iodine tolerance test for hyperthyroidism. Thus, when a small, definite amount of iodine is administered it will be removed from the

blood more quickly by the hyperplastic thirsty gland than by the normal gland.

The amount of iodine circulating in the blood is so very small that only recently have chemists been able to measure it with any degree of accuracy. It is customary to express these small amounts as gamma per cent, that is, as the number of gammas per 100 c.c. of blood. A gamma is equal to a micro-milligram, *i.e.*, 1/1,000 of a milligram.

Iodine is present in the blood in two main forms. One is soluble in alcohol, is inorganic, and is presumably the iodine of nutrition. The other fraction is alcohol-insoluble and organic, and is believed to represent the iodine of the thyroid hormone.

The blood iodine varies within very wide limits in normal people. Perkins found in estimations of the blood iodine of 143 normal persons that the values varied between 2 and 18.3 gammas, with an average of 6.5. In estimations of the blood iodine level of 331 with exophthalmic goitre the values varied from 2 to 114 gammas, the average being 18.8. A possible explanation for the low findings in certain of these hyperthyroid cases will be given later. Following the administration of iodine in such a case of exophthalmic goitre the blood iodine is markedly increased, especially the alcohol-soluble fraction. The alcohol-insoluble portion of representing thyroid secretion decreases. In hypothyroidism the iodine in the blood is low, and following total thyroidectomy it falls to a new and much lower level.

THE URINE IODINE

The urinary iodine also varies greatly from person to person, and from time to time in the same person. The average daily loss of iodine in the urine is approximately 55 gammas. In exophthalmic goitre this is greatly increased, with a daily iodine loss of 250 to 1,000 gammas. If the average daily iodine ration is considered to be about 0.25 mg. (250 gammas) such an individual is in negative iodine balance. In exophthalmic goitre there is therefore an "iodine diabetes", with increased blood iodine and increased loss of urinary iodine. Why this excessive iodine excretion should take place in one who needs the element so badly is unknown. The continued loss, moreover, eventually depletes the body iodine so that the blood iodine, which had previously been high, may fall to lower or normal levels again. It has been the experience at the Lahey Clinic that those with well marked clinical hyperthyroidism and who have a low or normal blood iodine are those who are likely to develop recurrence of hyperthyroidism following subtotal thyroidectomy. Removal of much more than the usual amount of gland tissue is, therefore, recommended in such cases.

THE EFFECT OF THE THYROID HORMONE ON THE TISSUES

The thyroid hormone increases tissue metabolism by about 40 per cent. In its absence tissue respiration does not fail—it merely proceeds at a lower level. In the process of the tissue respiration and oxidation there are two main groups of reaction, the first anaerobic, consisting in the breakdown to simpler substances, the second group, tissue oxidation proper, proceeding through cytochrome oxidase intermediaries. This latter reaction is retarded by cyanide and is believed to be the reaction increased or stimulated by the thyroid hormone.

BLOOD CHOLESTEROL AND THYROID DISEASE

That there is a relationship between the level of blood cholesterol and thyroid activity seems now to be very definitely established. This relationship is reciprocal, the level of the blood cholesterol tending to rise or fall inversely as the thyroid activity. Hurxthal, of the Lahey Clinic, who has investigated this extensively, believes that the blood cholesterol level is a more accurate index of thyroid activity than the basal metabolic rate determinations, especially in cases of hypothyroidism. Other causes of increased blood cholesterol, such as diabetes mellitus, nephrosis and infection, must of course be kept in mind. Cholesterol determination is of especial assistance in differentiating hypometabolism due to thyroid deficiency from other types, such as that due to pituitary or suprarenal cortical deficiency. In general it may be said that hyperthyroidism is associated with a low blood cholesterol which rises following thyroidectomy, and that hypothyroidism is associated with a high blood cholesterol which falls when thyroid extract is administered. While these statements regarding the relation of blood cholesterol to the activity of the thyroid gland appear to be true, one is not able at the present time to fully explain the mechanism through which this reciprocal relationship operates.

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Special Articles

DIET AND NUTRITION

THE NUTRITIONAL SIGNIFICANCE OF FAT*

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III.

FAT AS A SOURCE OF ENERGY

Weight for weight, the fats are a much richer source of energy than either the proteins or carbohydrates. This is due to several factors: the higher percentage of carbon and hydrogen; the relatively "dry" state of fat as compared with the high water content of the carbohydrates and proteins as they are ordinarily eaten; and the more complete digestibility of fat than of crude carbohydrates and proteins. The superiority of fats in this respect is of considerable practical importance. Man is by nature an omnivorous creature, and, as has been pointed out by Starling, the human alimentary tract is best suited to the digestion of relatively concentrated foodstuffs in which fat makes up 20 to 25 per cent of the energy content. Provided the energy requirement is moderate, a man can get along quite well on a very low fat diet. Indeed an experiment has recently been reported in which a man maintained himself for six months on a diet which provided only about 2 grams of fat per day. Subjectively, "the most noticeable feature was the marked absence of fatigue." However, in this case the diet used was specially selected and consisted mainly of skimmed milk, sugar and starch. If, on the other hand, one is forced to get along on a low fat diet, consisting mainly of the usual crude high carbohydrate foods, such as the cereals, and especially if required to do hard manual labour, then the observations are quite different. Based on the experiences in Britain and the central European countries during the World War, when fat consumption was greatly restricted, the low fat diets resulted in premature hunger, a reduced capacity to do sustained work, and in general a reduction in the energy intake below the usual maintenance level. It has been claimed that a high carbohydrate diet low in fat leads to excessive fermentation in the intestinal tract with resultant discomfort and disability.

There is considerable difference of opinion as to the optimum level of fat intake. For the average adult, about one-third of the calories seems to be a suitable level. However, it depends a good deal on the occupation. The harder the work, the greater is the energy requirement and the greater is the need for the more highly concentrated high fat diets.

IS THE NATURE OF THE FAT IN THE DIET AN IMPORTANT FACTOR?

Several years ago it was clearly shown by Burr and his co-workers that normal growth and well-being of the white rat requires the presence in the diet of certain unsaturated fatty acids which were best supplied by corn and linseed oils. It is noteworthy that butter, one of the important sources of fat in the human diet, does not satisfy the requirements of the rat unless fed at moderately high levels. These findings naturally raised the question of their bearing on human nutrition. Do human beings suffer from a deficiency of unsaturated fatty acids, and, if so, what are the symptoms? The experiment described above, in which a man lived for six months on a low fat diet, was specifically designed to put this to the test. No untoward results were observed. On the other hand, it has been reported that the feeding of unsaturated fats has a beneficial effect on certain human ailments.

It was observed that excessive scaliness of the skin of rats, especially that on the feet and tail, was a characteristic symptom of the so-called "fat deficiency" disease. It has been definitely shown that the fatty acids of the blood of children with eczema are on the average less unsaturated than those of the blood of normal children. Since this holds even when the eczematous and normal children have been kept on the same diet for several months, it would appear that the deficiency of unsaturated acids in eczematous children is due to some defect in the utilization of the unsaturated acids normally present in the diet. In 1933, Hansen reported that the administration of oils rich in unsaturated fatty acids to two infants suffering from eczema produced definite clinical improvement. Some other observers have reported favourably on this administration of unsaturated fatty acids to infants with eczema. Their results, however, have failed to find confirmation at other clinics.

Recently, Boyd and Connell have reported results which suggest that the administration of unsaturated fatty acids improves the resistance of human beings to the common cold. The ex-

* This is the third in the series of articles on Diet and Nutrition, prepared under the auspices of the Association's Committee on Nutrition. Previous articles can be found in the *Journal*, 1938, **38**: 277 and 387.

periment was carried out on a group of 41 students who reported the number and duration of colds incurred over two successive periods of seven weeks each, during the second of which they received 15 minims of an unsaturated fatty acid concentrate. The data showed a reduction in both the number and duration of colds during the treated period. Another group of 65 untreated students showed no appreciable reduction in colds during the same period. However, this group was made up of non-susceptible persons who had comparatively few colds in either period. In view of the rather small number of subjects and the inability to control such factors as diet, exposure to sources of infection, weather conditions, etc., these results must be regarded as merely an indication that the susceptibility of certain people to common cold may be due to a deficient intake of unsaturated fatty acids. On further individual cases of susceptible persons the authors have observed beneficial results from the treatment, but they recognize the need for a thorough and well-controlled study on a large group (personal communication).

Natural Fats as a Source of Vitamins

Since vitamins A, D and E are fat-soluble substances they occur under natural conditions in association with the fats. However, many of the common food fats, *e.g.*, pork fat and vegetable oils, contain insignificant amounts of the fat-soluble vitamins. It is now well recognized that the diet, especially in the case of growing children, should be supplemented with fish liver oils in order to insure an adequate intake of vitamin D.

Does Food Fat Have Harmful Effects?

It has sometimes been thought that diet, especially its fatty constituents, plays a part in the development of arteriosclerosis in human beings. Definite evidence of this is still lacking. It is true that in rabbits atherosclerosis can be produced experimentally by feeding cholesterol dissolved in fat. Such a diet produces a pronounced increase in all of the blood lipids. Since an increase in the blood lipids has also been found to occur very often in diabetes, and since uncontrolled diabetics show a high incidence of arteriosclerosis, the view has been advanced that there is a causal relationship between fat in the diet, the level of the blood lipids, and arteriosclerosis. However, it has been abundantly shown in recent years that diabetics under good control do not show an increase in blood lipids above the normal range, even if the diet is of a distinctly high fat type. Further, in persons who died from accidental injury there was no correlation between the degree of atherosclerosis and the level of the blood cholesterol. As Wyckoff has put it, "one fails to find a basis for thinking that there is a relation between arteriosclerosis and diet."

On the other hand, diet has been shown to be a very important factor in certain cases of essential xanthomatosis, in which there is an accumulation of cholesterol under the skin and in the tendon sheaths. Cholesterol, the sterol present in animal tissues and such animal products as milk, cheese and eggs, is readily absorbed from the intestinal tract. The phytosterols, the sterols of plants, because of a slight but important difference in chemical composition are not absorbed but are excreted in the fæces. Rigorous restriction of foods containing animal fats from the diet of persons suffering from essential xanthomatosis in some instances results in definite clinical improvement.

The Choice of Foods for Their Fat Content

As a general rule, the choice of foods by the providers of the individual families is bound to be governed by such factors as economic status, personal preference, season of the year, and the variety offered by available markets. Naturally the same factors influence the relative proportions of protein, carbohydrate, and fat in the diet and the source of the fat used. The prejudice of many people against the margarines as substitutes for butter is based largely on fancied differences in flavour. In terms of calories, the edible fats on the market are all the same. Being cheaper to produce than animal fats, the processed vegetable fats yield better value for the money.

The provision of the required number of calories is by no means the only requirement of an adequate diet. Recent developments in the field of nutrition have further emphasized the fact that many people may be suffering from a deficiency of the essential vitamins or minerals, even though their caloric intake is sufficient for their needs. And since fat meats are practically devoid of vitamins, one must be especially on the lookout for deficiency diseases among people who, for economic reasons or because they live in isolated communities, are forced to live, especially during the winter months, on simple diets made up for the most part of fat pork and potatoes.

In devising diets of either high or low fat content it will be helpful to remember that 1 g. of fat equals in calories 2.3 g. of carbohydrate or protein, and that the common foodstuffs can be grouped roughly as follows on the basis of fat content:

Low in fat less than 2 per cent	*Medium fat content* 2 to 10 per cent	*Rich in fat* above 10 per cent
vegetables	cream soups	butter and other fats and oils
most fruits	milk	salmon
cereals	veal	tuna
bread	chicken	lamb
egg whites	turkey	pork
buttermilk	lean beef	duck
	crab meat	goose
		egg yolks

Men and Books

A SKETCH OF THE CAREER OF DOCTOR JOHN ROBINSON DICKSON

BY THOMAS GIBSON

Kingston, Ont.

John Robinson Dickson was born at Dungannon, Co. Tyrone, Ireland, the son of David Dickson and Isabella Robinson, his wife, on November 15, 1819. At the age of eleven he was bound apprentice for six years to Mr. William McClean, apothecary. This term can hardly have been completed, for he spent some years at the Belfast Institution for his secondary education. His family designed him for the law, but he chose the medical profession early by a true instinct. To this end he entered the Andersonian College at Glasgow and pursued medical studies there until his family emigrated to Canada in 1837, when Dickson was in his eighteenth year.

In a pamphlet promoting his appointment as surgeon of the Kingston Penitentiary, in 1862, he gives this account of himself:—"I have been practising the various branches of my profession in Canada since 1838, with the exception of an absence at the University of New York (from October, 1841, until March, 1842), whither I went to attend a course of lectures and obtain my Doctor's Degree, to enable me to practise in New York, as I at that time had an intention of doing".

There had not been time to complete his course at Glasgow, hence, on coming to Canada, he became, as the custom was, an apprentice under some recognized practitioner of medicine. His chief was Dr. Hutchinson, of Peterborough, with whom he spent five laborious years. In 1841 he was licensed by the Medical Board of Upper Canada, an examining body functioning under the authority of the Governor-General. Having found country practice too exhausting, and being uncertain where to settle, he spent the winter session of 1841-42 at the University of New York under Drs. Valentine Mott, Pattison and Bedford, professors of surgery, anatomy, and midwifery respectively, graduating with the degree of M.D. in the spring.

Fortunately for Queen's University, Dr. Dickson finally decided to settle in Kingston, where he speedily built up a fine practice, and became known as a very able surgeon. Two of his successes, so long before the days of antiseptic surgery, were:

1. The removal of a fibrocartilaginous tumour which blocked the naso-pharynx of a young woman of twenty-four. The palatine plate and the inner wall of the antrum on the right side had to be removed with a small gouge, the tumour meanwhile being left *in situ* to prevent the downward flow of blood. After the labial artery was tied there was no serious hæmorrhage. The growth was then removed. The soft parts were united by a few sutures, aided by collodion smeared across the interval spaces. All stitches were out by the fifth day, and the patient went home on the fourteenth day. (*British American Journal,* Montreal, 1861, **2**: 199).

2. In the same Journal, (1861, **2**: 545) there is the report of a successful excision of the elbow joint in a youth of seventeen, for fixed deformity due to an old fracture-dislocation involving the internal condyle, with displacement of the ulna backwards and of the radius forwards. A four-inch vertical incision on the radial side of the back of the arm, with a transverse two-inch incision over the olecranon down to the periosteum, allowed all the soft parts to be deflected to the ulnar side with the ulnar nerve. A chain-saw divided the humerus one inch above the condyles; the olecranon was removed with bone forceps. No ligatures were needed. Three sutures brought the soft parts together, and "cold water was ordered to be assiduously applied". An anterior splint from armpit to hand was applied for twelve days, when gradual flexion and passive movement were practised daily. "In seven weeks the boy was able to flex the forearm and carry his hand to his mouth." Three and a half months after the operation he went home.

There is extant a testimonial to Dr. Dickson from Dr. John Mair (M.D., Edin.), one of the surgeons to the General Hospital at Kingston, in which he says that "in regard to his skill, tact, and delicacy in operating, Dr. Dickson was worthy to rank with Fergusson and Liston" whom he had seen at work in London.

Dr. Dickson's later degrees were:—M.R.C.P. and M.R.C.S. (Lond.) 1863, and F.R.C.S. (Edin.), 1867.

Dr. Dickson was Hon. John A. Macdonald's physician, and it was at his suggestion that Mr. Macdonald, in the summer of 1853, wrote with his own hand invitations to all the medical men of the town, asking them to meet at his house on Brock Street to consider the possibility of starting a teaching faculty of medicine in connection with Queen's University. A minute of the general proceedings in Dr. Dickson's script is extant, to which are appended a few lines in Mr. Macdonald's handwriting endorsing the accuracy of the record. When the Faculty was organized in the fall of 1854 and a start made with twenty-three students, Dr. Dickson was

appointed to the chair of surgery. After Dr. Sampson retired from active service Dickson was made Dean, Vice-President, as it was then called, the Principal being *ex-officio* President of the Medical Faculty.

In 1862, Dr. Sampson died and Dr. Dickson succeeded him as penitentiary surgeon. The same year, as Dean of Faculty, he had much to do with the troublesome effort to bridle the irrepressible Dr. John Stewart, of restless memory. Dr. Stewart, wishing to be elected a member of Parliament and Mayor of Kingston, had started a new series of his paper called the "Argus". In it he vented his spleen against all and sundry, his real or fancied enemies. He did not spare his medical colleagues either. His favourite nick-name for Dr. Dickson was "the man from Dungannon". Dr. Horatio Yates he appears to have disliked most of all, and finally he found himself landed in the county gaol for two weeks for slanderous abuse. Naturally, he had to be asked to resign his teaching office. This he did with a bad grace, hanging on to the college properties in his charge just as long as he could.

In the years 1863-64 a serious controversy arose between the Board of Trustees of Queen's and their medical faculty. The Government had been giving the university an annual grant of $5,000.00 for general purposes, and to the medical faculty, specifically, $1,000.00 per annum. In years of stringency the Board got into the habit of taking some of the medical dollars (the cheque was paid to the treasurer of Queen's) to balance their own budget, thus embarrassing a struggling faculty seriously. To this grievance was added the passing of a set of new statutes affecting the medical faculty, several of which were highly obnoxious to them.

The Dean of Faculty resigned at the spring convocation of 1864, in spite of the unanimous petition of the students urging him to stay. The addresses from the Faculty and from the students were forbidden to be read in Convocation Hall by the die-hards of the Board, so those concerned retired to the surgical classroom, rejoining the main assembly later. So the Board allowed the most active and brilliant of their medical staff to go without one word of thanks after ten years' strenuous service.

Dr. Dickson at once took steps with three other members of the old group to reorganize the Faculty as a proprietary "Royal College of Physicians and Surgeons of Kingston". This corporation was established by an Act of 1865, promoted by the Attorney-General for Canada West, Hon. John A. Macdonald.

At the University Convocation, in the fall of 1866, Dr. Dickson delivered a statesmanlike address setting forth the new state of affairs as between the university and the Royal College, and expounding the conditions laid down for matriculation into the medical schools of Upper Canada, and the course of studies leading up to graduation and registration qualifying to practise, which had been embodied in the Medical Act of Upper Canada, 1865. Incidentally, it is noteworthy that he gave utterance to one of the first recorded suggestions that one portal of entry should be set up for all Canada. "It is our sincere wish that one general Board should be appointed to conduct all the examinations in the different colleges throughout the land, and we feel assured that in no other way can a uniform standard of requirements be enforced."

Dr. Dickson continued to teach surgery till July, 1870; the deanship he retained till his death in 1882.

Among his many services to the students was his successful promotion of the recognition of the courses of medical study at Kingston by the Royal College of Surgeons, London, and the Royal College of Surgeons, Edinburgh, so that Kingston graduates might attempt the Fellowships of those distinguished corporations. After the passing of the Act of 1865, setting up the Council of Medical Registration and Education for Upper Canada, Dr. Dickson was chosen unanimously by the elected councillors as their first president for the year 1866-67. He represented the electoral district of Quinte and Cataraqui for three years.

In 1869 he was appointed to succeed Dr. Litchfield in charge of the criminal insane at Rockwood, a position which he held till 1878. By virtue of this appointment he was made a member of the Association of Superintendents of Insane Asylums of North America. At Rockwood he introduced radical reforms, of which the chief were the abolition of the routine use of alcohol, and the appointment of male and female nurses who had practised, and could teach, useful arts and handicrafts. A very marked improvement in general conditions and in the mortality and recovery statistics ensued. In 1878 his health suffered a very serious deterioration, and he retired to his son's house on Wolfe Island, where he died on November 23, 1882.

Dr. Dickson married in 1839 and had six children. Three sons followed their father's profession. The eldest, a brilliant youth, entered the Indian Army Medical Service and within a very few years succumbed to cholera. Dr. Charles R. Dickson lost his sight owing to the effects of unguarded exposure to x-rays in the early days of their use. Through him his father's papers were preserved and made available for record.

Association Notes

THE SIXTY-NINTH ANNUAL MEETING OF THE CANADIAN MEDICAL ASSOCIATION, IN CONJUNCTION WITH THE ANNUAL MEETING OF THE MEDICAL SOCIETY OF NOVA SCOTIA, TO BE HELD IN HALIFAX, JUNE 20, 21, 22, 23, 24, 1938

Convention Headquarters, Nova Scotian Hotel

The Canadian Medical Association

President, T. H. LEGGETT, Ottawa;
President-elect, K. A. MACKENZIE, Halifax;
General Secretary, T. C. ROUTLEY, Toronto.

Medical Society of Nova Scotia

President, A. CALDER, Glace Bay;
Secretary, H. G. GRANT, Halifax.

Message from the President-Elect

On behalf of the medical profession of Nova Scotia I wish to extend a hearty invitation to all members of the Canadian Medical Association to come to the convention in June and bring their friends.

The scientific program, now completed, is well up to the usual standards, and includes contributors from all parts of Canada as well as distinguished visitors from Great Britain and the United States.

Of special interest will be the Osler Oration, to be delivered by Sir Humphry Rolleston on "Osler, the Last Phase, and his Influence on Medicine." In addition to general sessions, sectional meetings are arranged in Surgery, Medicine, Otology and Ophthalmology, Obstetrics and Gynæcology, Radiology, Pædiatrics, Urology, Anæsthesia and Rheumatic Diseases, thus affording a wide variety of medical interests.

The scientific and commercial exhibits promise to be attractive features, and already applications have exceeded capacity.

The entertainment committee is very active, and gives us assurance that the social side of the convention will be well taken care of. Special programs are arranged for the ladies and young people.

It is felt that Halifax is admirably suited for convention purposes and that visitors from distant parts will find much of interest. It is hoped that many will take advantage of an extended visit in order to explore this province, so rich in natural beauty and historical lore. In June Nova Scotia is arrayed in beautiful and refreshing green with a variety of landscape and seascape to please the eye. Those who will take time to visit Annapolis, Louisburg, Grand Pré and other points will be amply rewarded for the extra time spent. If one has even a slight flare for geology much of interest will be found. Within the limits of the City may be seen extensive exposures of the gold-bearing Precambrian series, the oldest, save one, in Canada. In Point Pleasant Park may be seen the striæ left by the glacier of the last Ice Age, and from hotel windows masses of glacial drift, known to the geologist as drumlins and to the geographer as George's Island and Citadel Hill.

With the assistance of our Local Committees and a moderate share of curiosity to ferret out things of interest, everybody should have a good time. To those who come we offer our hospitality to the limit of our resources.

K. A. MACKENZIE

PROVISIONAL PROGRAM

Monday, June 20th

9.00 a.m.—Registration.
9.30 a.m.—Meeting of the General Council.
12.30 p.m.—Luncheon.
2.00 p.m.—Meeting of the General Council.
6.00 p.m.—Meeting of the Nominating Committee.

Tuesday, June 21st

9.15 a.m.—Meeting of the General Council.
12.30 p.m.—Luncheon.
2.00 p.m.—Meeting of the General Council.

Tuesday, June 21st—*Continued*

2.15 p.m.—Official Opening of the Exhibit Hall.
7.00 p.m.—Dinner to Council.

Wednesday, June 22nd

8.30 a.m.—Registration.
9.00 a.m.—General Session.
12.30 p.m.—Luncheon.
2.00 p.m.—Sectional Meetings.
8.30 p.m.—Annual General Meeting.

Thursday, June 23rd

8.30 a.m.—Registration.

9.00 a.m.—Sectional Meetings.

12.30 p.m.—Luncheon.

2.00 p.m.—General Session.

2.00 p.m.—Meeting of Incoming Executive Committee.

7.30 p.m.—Dinner, Nova Scotia Medical Society.

Friday, June 24th

8.30 a.m.—Registration.

9.00 a.m.—General Session.

12.00 a.m.—Luncheon.

1.00 p.m.—Annual Golf Tournament.

7.30 p.m.—Dinner, followed by presentation of prizes to winners at the Golf Tournament.
Alumni Dinners for those desiring to arrange them.

GENERAL SESSIONS

Wednesday, June 22nd

9.00 a.m.—

Symposium on poliomyelitis.—Drs. J. T. Phair, Alan Brown, D. E. Robertson, all of Toronto.

The Osler Lecture.—"Osler, the last phase, and his influence on medicine."—Sir Humphry Rolleston, Bart., Surrey, England.

Surgical clinic on cancer.—Drs. M. R. MacCharles, Winnipeg and William Boyd, Toronto.

Thursday, June 23rd

2.00 p.m.—

The results of phrenic nerve paralysis in pulmonary tuberculosis—a study of 250 cases, 1930 to 1937.—Dr. A. F. Miller, Kentville, N.S.

Leukoplakia and allied mouth conditions.—Dr. Douglas Quick, New York.

Benign lesions of the œsophagus.—Dr. E. E. Cleaver, Toronto.

Diagnosis of local lesions of the spinal cord.—Dr. Fred H. McKay, Montreal.

Friday, June 24th

9.00 a.m.—

Symposium on streptococcic sore throat; epidemiology, bacteriology and treatment.—Drs. A. L. McLean, Halifax, W. J. Deadman, Hamilton, P. B. Macfarlane, Hamilton.

Friday, June 24th—*Continued*

Spinal cord tumours.—Dr. A. W. Adson, Mayo Clinic, Rochester.

Observations on one thousand pre-eclamptics.—Dr. F. C. Irving, Boston.

Medical Clinic.—Dr. J. C. Meakins, Montreal.

SECTIONAL MEETINGS

Section of Anæsthesia

WEDNESDAY, JUNE 22ND

2.00 p.m.—

Improving our anæsthesia services.—Dr. E. W. Lunney, Saint John.

The selection of the anæsthetic.—Dr. Lincoln F. Sise, Lahey Clinic, Boston.

Fors clavigera in anæsthesia.—Dr. Wesley Bourne, Montreal.

Anæsthetic complications arising from reflex reactions during abdominal surgery.—Dr. E. A. Rovenstine, New York.

A comparison of ether, spinal and cyclopropane anæsthesia.—Dr. J. C. Houston, Charlottetown.

Section of Medicine

WEDNESDAY, JUNE 22ND

2.00 p.m.—

The complications of acute hæmorrhagic nephritis with report of a case.—Dr. L. C. Montgomery, Montreal.

The complications of diabetes mellitus with special reference to their cause and prevention.—Dr. A. A. Fletcher, Toronto.

Illness other than diabetic complications, in insulin patients.—Dr. A. F. VanWart, Fredericton.

The major forms of hereditary ectodermal dystrophy (lantern slides).—Dr. H. R. Clouston, Huntingdon.

THURSDAY, JUNE 23RD

9.00 a.m.—

Interpretation of the factor of latency in syphilis.—Drs. Frank E. Cormia and John A. Lewis, Montreal.

Unrecognized hypothyroidism.—Dr. G. K. Wharton, London.

Mental complications of heart disease.—Dr. A. H. Gordon, Montreal.

Cardiac emergencies.—Dr. G. F. Strong, Vancouver.

Roentgenology of the heart and great vessels.—Dr. J. H. Palmer, Montreal.

Section of Obstetrics and Gynæcology

THURSDAY, JUNE 23RD

9.00 a.m.—

Diagnosis and treatment of common disorders of menstruation.—Dr. E. V. Shute, London.

Thursday, June 23rd—*Continued*

The prophylaxis and treatment of puerperal infection.—Dr. John Fraser, Montreal.

The indications for Cæsarean section.—Dr. Ross Mitchell, Winnipeg.

Sterility.—Dr. W. P. Tew, London.

An eleven-year study of the prenatal clinic of the Dalhousie Public Health Clinic.—Drs. W. G. Colwell and A. L. McLean, Halifax.

Etiological factors and treatment of cancer of the cervix.—Dr. P. J. Kearns, Montreal.

Section of Ophthalmology and Oto-Laryngology

WEDNESDAY, JUNE 22ND

2.00 p.m.—

Tonsillectomy under intravenous anæsthesia in children suffering from chronic respiratory diseases.—Dr. Keith Hutchison, Montreal.

Bronchiectasis in relation to nasal sinus infection and tuberculosis.—Drs. L. DeV. Chipman and R. J. Collins, Saint John.

Carcinoma of the nasal accessory sinuses.—Dr. D. H. Ballon, Montreal.

Brain abscess.—Dr. William V. Cone, Montreal.

THURSDAY, JUNE 23RD

9.00 a.m.—

A comparison of hæmorrhage, blood pressures and hæmograms of 100 ear, nose and throat operations with ether, nitrous oxide and cyclopropane anæsthesia.—Dr. L. R. Teasdale, Montreal.

A clinical lecture on hoarseness (coloured lantern slides). — Dr. Perry Goldsmith, Toronto.

Problems in the diagnosis and treatment of glaucoma.—Dr. W. G. M. Byers, Montreal.

The use of urea and caroid in chronic otitis media.—Dr. G. E. Tremble, Montreal.

Asthenopia.—Dr. J. F. A. Johnston, Toronto.

2.00 p.m.—

A comparison of clinical and x-ray examinations in paranasal sinusitis.—Drs. Geo. Hilton and E. M. Crawford, Montreal.

Facial paralysis complicating the mastoid operation, and how to avoid it (lantern slides). —Dr. J. A. Sullivan, Toronto.

Physiology of the internal ear. Vertigo of otitic origin, its diagnosis, treatment, and demonstration of tests.—Dr. W. J. McNally, Montreal.

The neurological aspect of oto-laryngogical complaints.—Dr. E. F. Brooks, Toronto.

Severe hæmorrhage from the naso-pharynx.—Dr. B. V. Bradley, Toronto.

Section of Pædiatrics

WEDNESDAY, JUNE 22ND

2.00 p.m.—

Otitis media from the pædiatrician's point of view.—Dr. Geo. Campbell, Ottawa.

Anæmia in infancy.—Dr. N. B. Coward, Halifax.

Some common pædiatric conditions frequently mishandled.—Dr. Alan Brown, Toronto.

Allergy in childhood.—Dr. T. M. Sieniewicz, Halifax.

The diagnosis of heart conditions in early childhood.—Dr. A. P. Hart, Toronto.

Section of Radiology

WEDNESDAY, JUNE 22ND

2.00 p.m.—

A re-evaluation of x-ray technique and diagnosis.—Dr. E. A. Petrie, Saint John.

Carcinoma of the sigmoid colon—a radiological study.—Drs. A. C. Singleton and M. M. R. Hall, Toronto.

Gastro-intestinal diagnosis.—Dr. Richard Schatski, Boston.

X-ray therapy.—Dr. J. E. Gendreau, Montreal.

THURSDAY, JUNE 23RD

9.00 a.m.—

Radiological investigation of diseases in the region of the hypopharynx.—Dr. E. H. Shannon, Toronto.

The rôle of radiology in the diagnosis and treatment of the primary and secondary lesions of carcinoma of the breast.—Drs. W. A. Jones and R. C. Burr, Kingston.

Lipiodo-bronchography.—Drs. J. Gosselin and J. E. Perron, Quebec.

Bone tumours.—Dr. C. M. Jones, Halifax.

Section of Rheumatic Diseases

THURSDAY, JUNE 23RD

9.00 a.m.—

The clinical approach to the rheumatic diseases. —Dr. A. A. Fletcher, Toronto.

The aims and objects of the Canadian Rheumatic Disease Association.—Dr. W. S. Barnhart, Ottawa.

Rheumatic fever.—Dr. J. C. Meakins, Montreal.

Diagnosis of chronic arthritis.—Dr. J. W. Merritt, Halifax.

The management and treatment of rheumatoid arthritis.—Dr. G. Douglas Taylor, Montreal.

A short business session of the Canadian Rheumatic Disease Association will be held immediately at the close of this program.

Section of Surgery

WEDNESDAY, JUNE 22ND

2.00 p.m.—

The Band operation.—A detailed description of its technique (lantern slides).—Dr. W. O. Bigelow, Brandon, Man.

Fracture of the neck of the femur.—Dr. W. E. Gallie, Toronto.

Fractures of the morphological neck of the humerus in children.—Dr. L. J. Austin, Kingston.

(Subject to be announced).—Dr. H. K. McDonald, Halifax.

Fracture of the jaw. — Dr. Fulton Risdon, Toronto.

THURSDAY, JUNE 23RD

9.00 a.m.—

Some surgical aspects of tuberculosis.—Dr. C. A. McIntosh, Montreal.

Duodenal ulcer. — Dr. Roscoe R. Graham, Toronto.

Carcinoma of the breast.—Dr. J. G. MacDougall, Halifax.

Peripheral arterial disease.—Dr. H. M. Elder, Montreal.

Heparin and thrombosis.—Dr. D. W. G. Murray, Toronto.

(Subject to be announced).—Dr. Donald Mainland, Halifax.

Section of Urology

WEDNESDAY, JUNE 22ND

2.00 p.m.—

Horseshoe kidney.—Dr. K. P. Hayes, Halifax.

Principles of the treatment of urinary infections by medication.—Dr. D. R. Mitchell, Toronto.

Recurrent *B. Coli* infection in women.—Dr. S. A. Wallace, Kamloops.

Common surgical conditions of the female bladder neck.—Dr. Magnus I. Seng, Montreal.

Management of ureteral calculi.—Dr. Colin Chisholm, Toronto.

THURSDAY, JUNE 23RD

9.00 a.m.—

Treatment of hydronephrosis. — Dr. C. B. Stewart, Winnipeg.

Obstruction of bladder neck following prostatectomy.—Dr. F. G. Mack, Halifax.

Cysts of the kidney.—Drs. F. S. Patch and Lorne G. Wood, Montreal (by invitation).

Chronic prostatitis (non-specific) with special reference to symptomatology.—Dr. Earle R. Hall, Vancouver.

Aberrant renal vessels, with report of cases.—Dr. Gordon A. Winfield, Halifax.

Lymphogranuloma inguinale.—Dr. Donald S. Mitchell, Montreal.

Entertainment Program

Halifax and Nova Scotia are most beautiful in June, and much of the entertainment, particularly that for the ladies, has been planned for the outdoors. On Wednesday, June 22nd, will be an excursion over the twenty odd miles of sea that goes to make up Halifax Harbour. There will be a military band on the boat and a buffet supper will be served. Wednesday evening is the Annual Meeting, and following the inauguration of the new president will be held the President's Reception and Ball. On Thursday the ladies will lunch at the Ashburn Golf and Country Club; in the afternoon they will be guests of His Honour, Lieutenant-Governor Irwin and Mrs. Irwin at the beautiful, historic old Government House. There will be golf for the ladies on Friday morning, and, for those who prefer it, sailing over the harbour waters on the private yachts of the Royal Nova Scotian Yacht Squadron. Friday afternoon will be a drive to Silver Sands, to bathe in the surf, and those interested may return later to play or watch at the golf tournament for ladies. This will be held at Brightwood, its course laid up on the hilly summits of Dartmouth, above the harbour.

At the Brightwood tea, following the tournament, will be a dance for the younger guests. They have not been forgotten in the entertainment. The Waegwoltic Club, on the banks of North-west Arm, scarcely ten minutes away from the most distant hotel, will be open to them throughout their stay. There they will find sea bathing, boating, tennis, quoits, etc. On the evening of Tuesday, June 21st will be held a wiener roast among the birches of Flemming Park on the shores of the Arm. On Wednesday there will be a special luncheon for junior guests and that same evening their dance in the Waegwoltic Club house. With invitations extended them to all the senior activities, as well, in which they may find interest, it is hoped the younger visitors will find their stay in Halifax enjoyable.

The members of the Council and those who are wise and wish to get most from their visit to Halifax will plan on arriving on Sunday, June 19th at the latest. Monday will be reserved for private entertainment, but the regular program begins on Tuesday morning. Following registration at 9 a.m. at the Nova Scotian Hotel there will be a drive to Waverley, around the beautiful Dartmouth lakes. Guests will arrive at Green Acres for morning coffee, and return to the city in time for lunch. That afternoon Dr. and Mrs. Mathers will be hosts to the visitors at tea in the grounds of their delightful estate at Boulderwood. Dinner to the visiting ladies will be tendered by the Nova Scotian doctors' wives on Tuesday evening. On Wednesday morning small picnic parties and drives to points of interest will be arranged.

Of special interest to the doctors will be the daily luncheons at the Nova Scotian Hotel at which prominent local speakers will give brief talks on topical matters. The Annual Meeting of the Nova Scotia Medical Society will be held at dinner on Thursday, June 23rd and will be open to all members of the Canadian Association. The Annual Meeting and Dinner of the New Brunswick Medical Society will be held at the same time. Friday afternoon, the last session of the meeting, will be given over to a golf tournament at Ashburn and the convention will close in typical Nova Scotian style with a lobster supper at a nearby beach.

Hotels

The Committee on Housing and Hotels advises all those wishing hotel reservation to write *AT ONCE*, direct to the hotel of their choice. If that hotel is filled to capacity the Committee will do its best to provide the next best accommodation.

Following is a list of the hotels with their capacities and rates:

Nova Scotian Hotel, 100 double rooms, $5.00 – $6.00.

Lord Nelson Hotel, 100 double rooms, single $3.00; double $5.00 up; suites $8.00 up.

Carleton Hotel, 25 rooms, single $1.50 up; double $3.00 up.

Halifax Hotel, 75 rooms, single $2.00 up; double $3.50 up.

Queen Hotel, 75 rooms, single $1.50 up; double $2.50 up.

Those wishing to reserve accommodation in smaller establishments or in some of the nearby seaside hotels should communicate with the Chairman of the Committee, who will gladly forward lists of such places—Chairman, Dr. A. R. Morton, 2 Brenton Place, Halifax, N.S.

Historic Halifax

"Into the mists my guardian prows put forth,
Behind the mists my virgin ramparts lie,
The warden of the Honour of the North
Sleepless and veiled am I."

So sang Rudyard Kipling of Halifax, one of the most strongly fortified cities in the world, founded in 1749, by Hon. Edward Cornwallis, a younger son of a noble family. It is doubtless the first town in Canada which was primarily settled by the English. Trading and fishing posts had been established on or near the present site perhaps one hundred years previously. The fort most interesting to visitors, and in fact the only fort visitors are allowed to enter, is the Citadel, or Fort George, now obsolete, which rises high above the town and was designed by Col. Nicholls, Commanding Royal Engineer. It was commenced on the site of an older work in 1828 and took nearly thirty years to complete. An object of much interest to visitors is the old Town Clock which was erected in 1802. The dockyard, commenced in 1759, contains relics and structures of great interest—a masthouse erected in 1759, a sail-loft built in 1769, and a clock tower dating back to 1770. Here also the spot is marked where the late King Edward VII, on his tour when Prince of Wales, landed on July 30, 1860, and the Marquis of Lorne and Princess Louise in 1878. Very many distinguished naval men have been associated with the dockyard and Admiralty House which is near it.

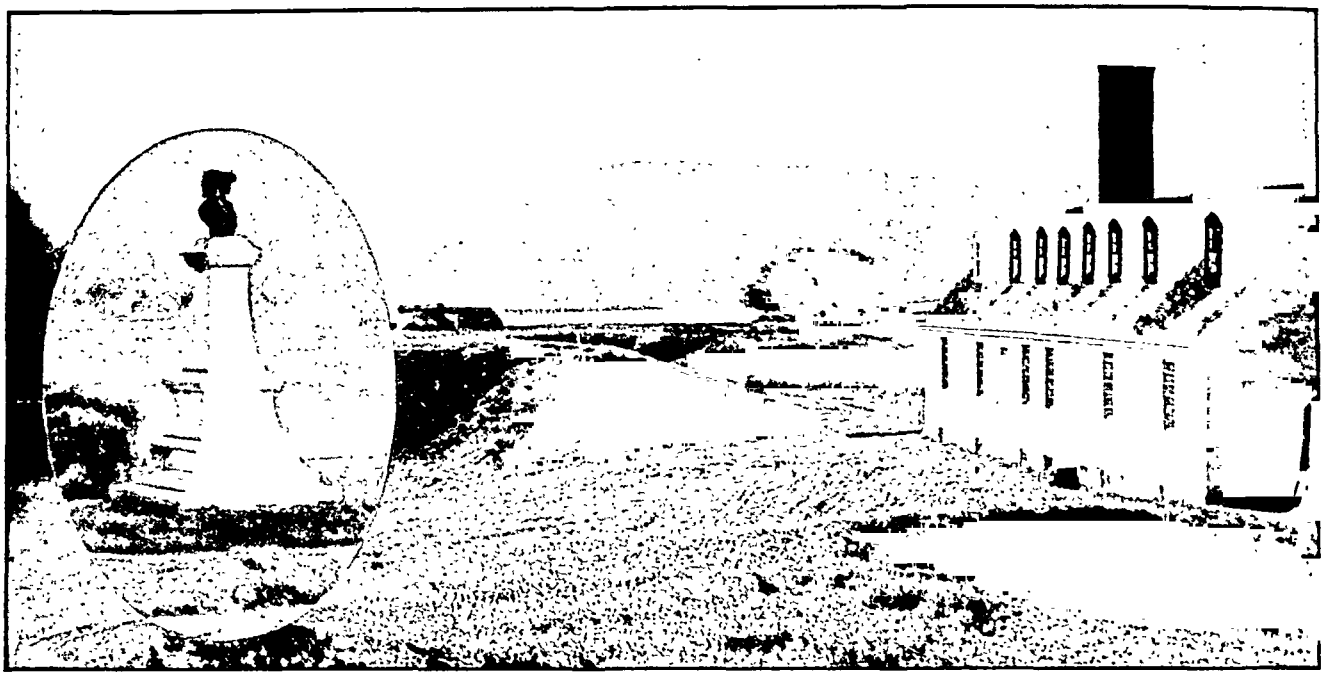
From every standpoint—scenic beauty, boating, bathing, yachting, all aquatic sports, golfing, as well as historic associations—Halifax offers a very wide variety of attractions. Two fine golf courses. "Ashburn," an eighteen-hole course of 5,512 yards, occupies a charming site of 130 acres of wooded land at the picturesque Dutch Village, or Westernvolt, at it was once called, between the head of the North West Arm and Bedford Basin. This is a real course and one that the true golfer delights in, with magnificent vistas, rolling surface, and an abundance of natural hazards. Ashburn is but 15 minutes ride from the centre of the City. "Gorsebrook," an eighteen-hole course of 3,902 yards, is also open to visitors. This course is very conveniently situated on Tower Road at the south end of the city. Rolling land and good turf add to the pleasure of a round, and each hole has a character of its own.

Point Pleasant Park, the largest pleasure ground, is reserved by the Crown for purpose of defence, but is leased to the city for the proverbial shilling a year for 99 years. The "Martello Tower," or Prince of Wales Tower, in the park, was erected in 1796 by direction of H.R.H. the Duke of Kent, father of Queen Victoria, who commanded the military forces in Nova Scotia at that period. Several other forts are located in the park.

The Public Gardens, founded about 1753, are famed for their beauty.

In the chancel of the extremely interesting St. Paul's Church, erected in 1750, and therefore the oldest Protestant Church in Canada. are tablets to the memory of Sir John Wentworth, a Governor of New Hampshire before the days of Independence, and afterwards Governor of this province; the Right Rev. Charles Inglis, D.D., the first Protestant Bishop of British North America; and Sir John Harvey, a hero of the war of 1812-14. There are twenty vaults beneath the church in which are interred many distinguished men of old days. The walls are covered with numerous tablets and quaint funeral hatchments commemorating many highly distinguished personages. The bells were presented in 1812 by Hon. A. Belcher. St. George's Church was erected in 1800 and is a rare example of the round type of ecclesiastical architecture.

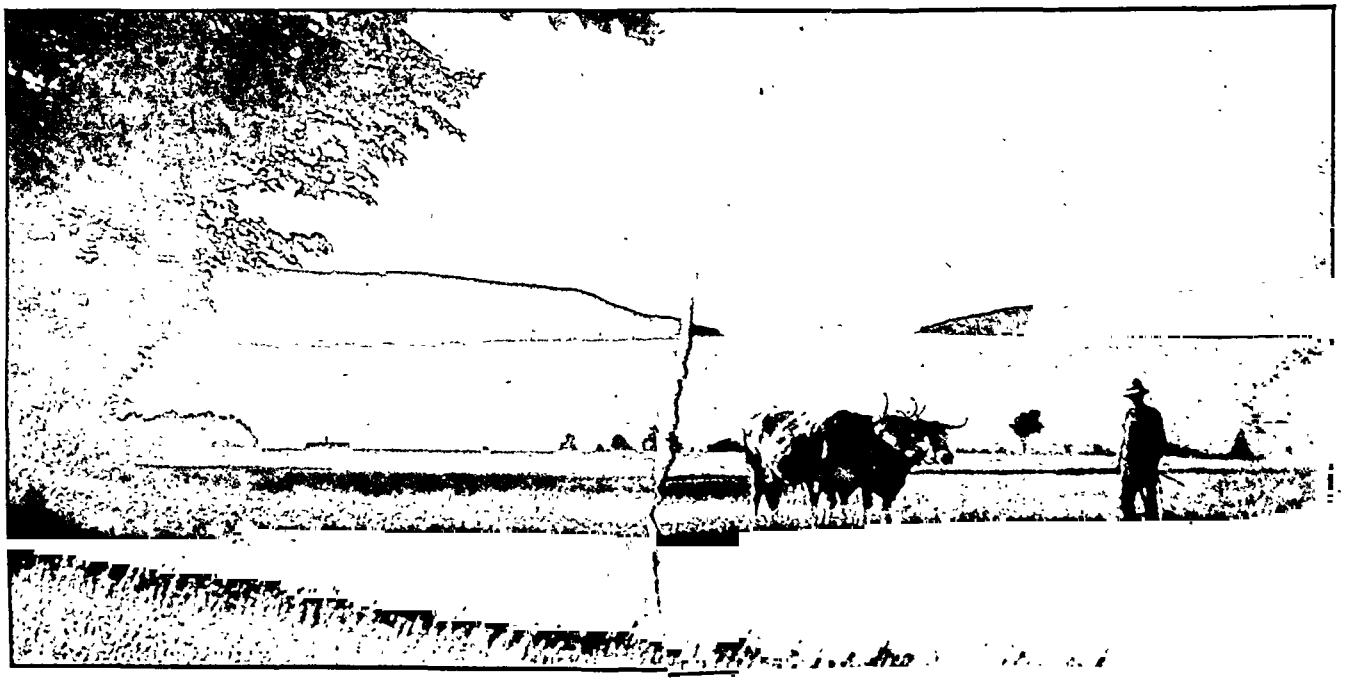
St. Paul's cemetery on Barrington Street has not been used for burial since 1844. It contains the remains of the forefathers of the town



Old Fort Anne at Annapolis Royal, N.S. Annapolis Royal is the oldest settlement in Canada (1604). Inset is a picture of the Memorial to De Monts, the Founder.

since 1749. It is open to the public during the summer months. Inside the gate is an imposing monument, surmounted by a lion, erected to the memory of Capt. Parker and Major Welsford, two Nova Scotians who were killed in the Crimean War. The quaint old Dutch Church on Brunswick Street was erected in 1756, and surrounding it is a cemetery in which are buried the early German settlers. The first newspaper printed in what is now Canada, the *Halifax Gazette*, was issued from a press on Grafton Street, in 1752, the site being marked with a tablet.

Chain Rock in Point Pleasant Park is interesting. In the early days (1762) when there was fear of an enemy passing up the North-west Arm, a boom of chain and timber was placed across from shore to shore, its ends secured by ring-bolts in the solid rock. The low mounds at the point where descent to the shore is made are the remains of an earthwork built to defend the boom. The North-west Arm, with its large Memorial Tower commemorating the advent of representative government in 1758, is a sheet of water which has become famous for its scenery and its facilities for



Digby Gut, opposite Digby, N.S.

boating and all forms of aquatic sports. During the American Civil War the Confederate cruiser *Talahassee* made a thrilling dash to sea through the narrow Eastern Passage to escape from United States warships which were waiting to capture her off the entrance to the harbour.

Dalhousie University, on Coburg Road in the west-end suburbs, has a notable group of buildings. This college was founded in 1818, being endowed with funds collected at Castine, Maine, during the British occupation in 1812-14. The University has old established Faculties of Arts and Science, Law, Medicine and Dentistry, and Schools of Engineering, Commerce, Fisheries and Pharmacy. The professional schools are on the Carleton Campus on Morris Street, the Public Health Clinic being specially worthy of a visit. The Studley Campus on Coburg Road is the home of the Arts and Science side of the University and the residential area. King's University was recently moved from Windsor to Halifax, to occupy a new site with a stately quadrangle on the Dalhousie campus at "Studley".

About six miles from Halifax on the Bedford Road, the Duke of Kent from 1794-1800 had a suburban residence called "The Lodge". The round band-stand or belvedere is the only one of the buildings still standing. History tells of some of the fair dames who graced with their beauty this once famous mansion.

Life was gay in Halifax at the beginning of the nineteenth century. The Duke of Kent had established all manner of festivity during his stay, and the social set, largely composed of well-paid army officers, were resolved that their pleasures should continue. The Coffee Houses were used as banqueting halls, and nomadic minstrels, rhymers and silhouette artists helped entertain. Sundays were gay days. The taverns conducted a thriving trade, and society paraded in all its finery, while regimental bands played outside the homes of the commanding officers. Ladies with high ostrich plumes, fans and rustling silks, and gentlemen in knee breeches, coloured waistcoat, stocks and frills, wearing wigs and queues, indulged in extravagant ceremony.

The streets were colourful with traders from West Indian ports, many wearing large gold rings in their ears, and bright red sashes about the waist. The Indians had curb markets where squaws sat during the day with bows and arrows, axe handles, baskets and even canoes, to sell. There were apple and cake stalls for fishermen and dock labourers, and these also sold hard-boiled gulls' eggs and lobsters. Red woollen caps were worn by market fishermen as a distinguishing mark. Maids from the wealthy homes cleaned all fish they purchased at the market.

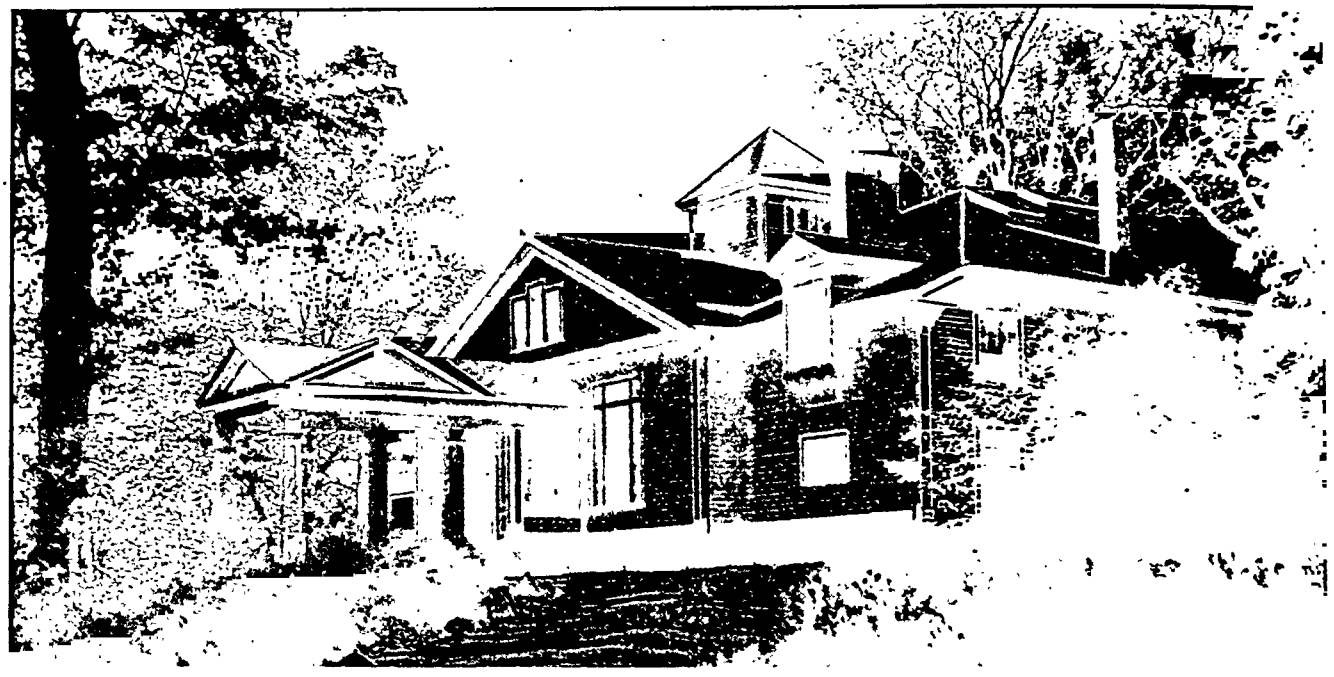
A public whipping post was set in the Square and there were stocks in which drunkards were placed. Married soldiers drew small pay but plentiful rations of Irish pork and split peas, and it was a morning custom for their wives, clad in blue military cloaks, to go from door to door, selling part of their daily food supply. At noon they were often seen near the barrack square, sobbing as their husbands were being given a stiff application of the lash. Discipline was harsh and often ten or twelve culprits would be so punished within the hour.

Many homes had wells in their yards, but others depended on the town pump, which was an evening rendezvous for boys and girls getting water for tea. Rum was plentiful. Labourers and charwomen were allowed two glasses per day by their employers. A pail of rum and dipper were in each shop for the needs of customers; boarding houses kept an ever-ready supply on the sideboard. Licensed chimney sweeps made their rounds, and the law demanded that their services be employed. Smoking on the streets was prohibited. Sedan chairs were used as taxis, and the regular fee was one shilling. Auctions of church pews were held each year. A town crier called out all important sales and transactions, and at New Year made his rounds, ringing his bell, and reciting poetry at each house. He was busily employed during spring months when fur buyers were active, crying different prices each day.

Dancing and singing classes had large attendance as it gave the young folk an excuse for meeting. Day schools were private and expensive, with classes early in the morning, and in the evening as well. Girls received instructions in "knitting sewing—plain, ornamental and flourishing—purse work, bead work, shell work, wax work and drawing." Curious advertisements were displayed at the taverns. "At the Sign of the Hand and Pen, spelling, reading and writing taught. Arithmetic in all its parts." "Reading school of children kept. Gold and silver lace cleaned. Mourning stiffened." "A native of Quebec teaches sword exercise, French language and dancing."

It was thirty years after the founding of Halifax before all stumps were removed from its streets. Settlers were reluctant to occupy lots over an old Indian burial ground near the centre of the city. Casks were filled with sand and gravel and placed about the Governor's house, and cannon mounted on them. Wildcats were often shot near the buildings, and the last one killed in the city was mounted and is now on display in the Provincial Museum. The town firemen were assisted by the soldiers, who were more proficient with the wooden buckets than the regular fire brigade. Amateur plays provided entertainment, and two announcements were always made: "Will the ladies please dress their heads down as low as possible. No children in laps will be admitted!"

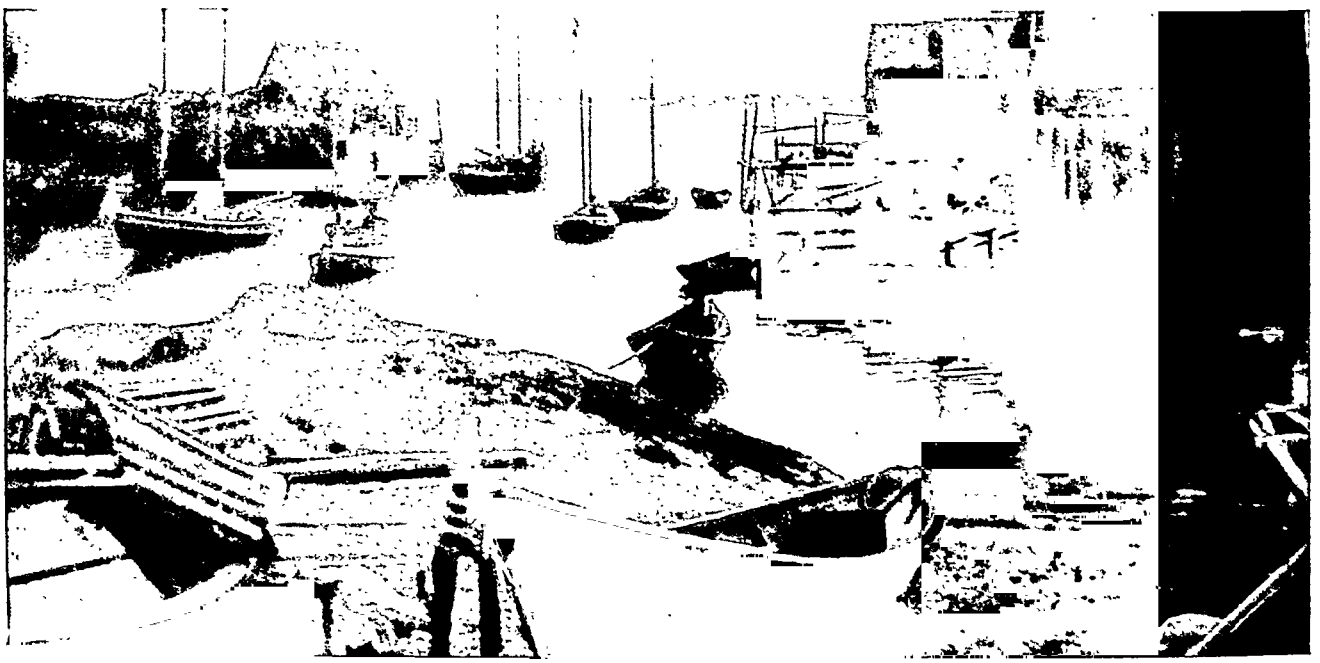
The Sleigh Club had many members and weekly drives were made to Nine Mile River on



The Sam Slick house at Windsor, N.S.

the Windsor Road, the equipages consisting of tandems, four-in-hands, curricles, unicorns and singles. Two gentlemen in the leading sleigh sounded horns or bugles. Plentiful bearskins were the wraps provided. Stoves for heating churches were installed in 1795. Up to that date the winter services were frost-filled. The preachers wore thick, heavy cloaks, cap and fur-lined mittens. The male listeners were clad in thick coats and scarves, and the ladies kept warm by means of a basket containing heated stones or brick. The hour glass was often turned twice during a discourse, and a deacon was appointed solely to keep order. Soldiers sat in the gallery, the infantry to the north, the engineers and artillery to the south, their white starched trousers holding the attention of the younger folk. Press gangs were responsible for many missing young men. Public meetings were called at "candle lighting".

The historic Province House, finished in 1818, which was formerly spoken of as the finest specimen of the Georgian type of architecture on this continent, contains many valuable old portraits and some relics of great interest. The Provincial Museum, in the Technical College, has



Typical Nova Scotian fishing village. The shore fishermen of Nova Scotia are friendly people and oftentimes summer visitors accompany them in their quest for the delicious seafoods that help to make a vacation enjoyable in the Ocean Playground.

an extensive collection of the natural resources of the province as well as of objects of real historic interest. Many interesting buildings in Halifax have been marked with tablets by the Nova Scotia Historical Society.

(Courtesy of Publicity Bureau, Province of Nova Scotia).

CONSTITUTION AND BY-LAWS APPLICABLE TO DIVISIONS

The following "Constitution and By-Laws" of the Canadian Medical Association, *applicable to Divisions*, as amended by the Committee on Legislation and By-Laws and the Executive Committee, is presented in the May and June issues of the *Journal* according to the rule of the existing Constitution of the Association, in order that it may be legally dealt with at the Annual Meeting in Halifax.

CONSTITUTION

ARTICLE I.—TITLE

This Association shall be known as The Canadian Medical Association, and when the French language is used, it shall be known as "L'Association Médicale Canadienne".

ARTICLE II.—OBJECTS

1. The promotion of health and the prevention of disease.
2. The improvement of medical services however rendered.
3. The maintenance of the integrity and honour of the medical profession.
4. The performance of such other lawful things as are incidental or conducive to the welfare of the public and of the medical and allied professions.

ARTICLE III.—ETHICS

The Code of Ethics of The Association (see Appendix*) shall be such as may be adopted by The Association from time to time. A copy shall be supplied to each member of The Association.

ARTICLE IV.—MEMBERSHIP

The Association shall be composed of ordinary members, members-at-large, senior, non-resident and honorary members, elected by the method set forth in the By-Laws.

ARTICLE V.—BRANCH ASSOCIATIONS

Each Provincial Medical Association, or the body representing organized medicine in a province and enjoying all the rights and privileges of a medical association may be recognized as a Branch Association, but any Branch Association, if it so desire, may change its relationship to The Canadian Medical Association and become a Division by the method set forth in the By-Laws. It shall then be known as The Canadian Medical Association (name of Province) Division.

ARTICLE VI.—AFFILIATED SOCIETIES

Any nationally or internationally organized medical, scientific, or sociological body may, subject to the approval of the General Council, become affiliated with The Canadian Medical Association. Affiliation shall be understood to imply the establishment of a friendly relationship with the affiliated organization. There shall be no obligation on the part of either party to the affiliation to sponsor policies or movements on the part of the other.

ARTICLE VII.—MEETINGS

The meetings of The Association shall be held in whole or in part on such occasions as may be provided for in the By-Laws.

* The Appendix referred to in this draft is to be printed later.

ARTICLE VIII.—OFFICERS

(*a*) The Patron.

(*b*) The elective officers of The Association shall be a President, a President-Elect, a Chairman of the General Council, and an Honorary-Treasurer.

(*c*) The appointive officers of The Association shall be a General Secretary and such other officers as may be appointed by the Executive Committee. The appointive officers shall have no voting power.

ARTICLE IX.—THE GENERAL COUNCIL

In so far as it relates to Divisions, the General Council shall consist of:—

(*a*) The officers of The Association.

(*b*) The President and Secretary of each Division.

(*c*) Delegates elected by Divisions including members of the Nominating Committee.

Each Division shall be entitled to elect five delegates to serve on the General Council for its membership in The Canadian Medical Association of fifty or less; one additional delegate for its membership from fifty-one to one hundred; one additional delegate for its membership from 101 to 300; and thereafter one delegate for every 300 above 300. One divisional representative on Council may be named by the Division as its nominee to the Nominating Committee of the Association.

(*d*) Chairmen and Secretaries of Committees of The Association.

(*e*) Chairmen and Secretaries of Sections of The Association.

(*f*) Past-Presidents of The Association.

(*g*) Two representatives of the Department of Pensions and National Health.

ARTICLE X.—COMMITTEES

The Committees shall be (*a*) Standing; (*b*) Special.

(*a*) The Executive Committee shall be elected by the General Council; the other standing committees shall be appointed by the Executive Committee.

The standing committees are as follows:—

1. The Executive Committee.
2. The Committee on Legislation.
3. The Committee on Medical Education.
4. The Post-Graduate Committee.
5. The Central Programme Committee.
6. The Committee on Constitution and By-Laws.
7. The Committee on Archives.
8. The Committee on Public Health.
9. The Committee on Ethics and Credentials.
10. The Committee on Economics.
11. The Committee on Pharmacy.
12. The Committee on Hospital Service.
13. The Cancer Committee.

(*b*) Special Committees may be appointed by—

(i) The President
(ii) The General Council
(iii) The Executive Committee
(iv) The Chairman of the General Council.

ARTICLE XI.—FUNDS

Funds for the purpose of The Association shall be raised in such manner as may be determined by the General Council.

ARTICLE XII.—THE ASSOCIATION YEAR

The Assoication year shall be the calendar year.

ARTICLE XIII.—AMENDMENTS

1. Notice of Motion by one or more members to amend the Constitution must be placed in the hands of the General Secretary six months before the date of the annual meeting.

2. Amendments may be proposed by the General Council, the Executive Committee, or the Committee on Constitution and By-Laws without notice of motion, but

the proposed amendments shall be published in the *Journal* in two issues preceding the annual meeting.

3. The Constitution shall be amended by a two-thirds vote of the members of the General Council in session present and voting.

ARTICLE XIV.—PROVINCIAL AUTONOMY

No provision of the Constitution or By-Laws herein set forth shall interfere with the status of a Division as a provincial organization. As a provincial body it shall have complete control of its own affairs, and if it choose, may retain its present name, as well as being known as Canadian Medical Association (name of Province) Division.

BY-LAWS

CHAPTER I.—DIVISIONS

A Branch of The Canadian Medical Association may become a Division as outlined in Chapter V of the Constitution and enjoy all the rights and privileges of a Division in the following manner:—

1. By intimating to The Canadian Medical Association in writing that it desires to become a Division.

2. By agreeing to amend, where necessary, its Constitution and By-Laws to place them in harmony with the Constitution and By-Laws of this Association.

3. By agreeing to collect from all of its Divisional Members who desire to be members of The Canadian Medical Association such annual fee as may from time to time be set for membership and remit same to this Association.

4. By agreeing to take such steps as seem proper to the Division to increase membership in The Association.

CHAPTER II.—MEMBERSHIP

Section 1—Ordinary Members

Every Member in good standing in a Branch Association or a Division shall be automatically an ordinary Member of The Canadian Medical Association on payment of the annual fee as levied by the General Council.

Section 2—Members-at-Large

Any graduate in Medicine, residing in Canada, who is not a Member of a Branch Association or of a Division may be accepted as a Member-at-large of The Canadian Medical Association provided that, with his application, a certificate of approval from the executive body of the Branch Association or Division in the Province in which the applicant resides be furnished to the General Secretary. In the case of an applicant residing in Canada in a territory beyond the jurisdiction of a Branch Association or of a Division, the application must be endorsed by two Members of The Canadian Medical Association. Such Members shall be designated "Members-at-Large" and shall pay the annual fee as levied by the General Council.

Section 3—Senior Members

Any Member of The Association in good standing for the immediately preceding ten-year period who has attained the age of seventy years is eligible to be nominated for Senior Membership by any ordinary member of The Association, but may be elected only by the unanimous approval of the members of the General Council in session present and voting. Not more than ten such Senior Members may be elected in any one year. Senior Members shall enjoy all the rights and privileges of The Association, but shall not be required to pay any annual fee.

Section 4—Non-Resident Members

Non-Resident Members may be elected by the Executive Committee from regularly qualified practitioners residing outside of Canada. They shall be required to pay not more than seventy-five per cent of the annual fee for Members-at-Large.

Section 5—Honorary Members

Honorary Members may be nominated by any Member of The Association and shall be elected only by a unanimous vote of the General Council in session present and voting. Not more than five Honorary Members may be elected in any one year and at no time shall the list of living Honorary Members exceed twenty-five. Honorary Members shall enjoy all the rights and privileges of The Association, but shall not be required to pay any annual fee.

Section 6—Discipline of Members

Any Member failing to conform to the Constitution and By-Laws and/or Code of Ethics (see Appendix) shall be liable to censure, suspension or expulsion.

(*a*) Any Member whose annual fee is directly payable to The Canadian Medical Association and whose annual fee has not been paid on or before the 31st day of March of the current year, may, without prejudice to his liability to The Association, be suspended from all privileges of membership.

(*b*) Any Member who has been found guilty of unprofessional conduct may, upon representation of the facts to the General Council, be censured, suspended or expelled from The Canadian Medical Association.

Section 7—Restoration to Membership

A Member, suspended or expelled, shall not be restored to membership until all arrears of fees (if directly payable to The Canadian Medical Association) have been paid, or until such requirements as may be determined by The General Council or the Executive Committee have been met.

Section 8—Resignation from Membership

Membership in The Association shall automatically cease only on suspension, expulsion or death. Resignation may be effected by giving notice in writing to the Secretary of the Division not less than one month before the beginning of the calendar year; or in the case of a Member-at-Large by giving notice directly to the General Secretary of The Canadian Medical Association one month before the next annual fee is due.

Section 9—Registration at Meetings

No Member shall take part in the proceedings of The Canadian Medical Association or in the proceedings of any of the Sections thereof or attend any part of the meeting until he has properly registered. Only Members and invited guests are eligible to register and attend an annual meeting.

CHAPTER III.—GUESTS AND VISITORS

Section 1—Visitors from outside of Canada

Medical practitioners and other men of science residing outside of Canada may attend the annual meeting as guests of the President or of the General Council or as visitors when vouched for by the General Secretary. They shall register with the General Secretary without payment of fee and may, after proper introduction, be allowed to participate in discussions.

Section 2—Medical Students Attending Meetings

Any hospital intern or medical student, when properly vouched for, may be admitted as a guest to the scientific meetings but shall not be allowed to take part in any of the proceedings unless specially invited by the Committee on Programme to present a communication.

Section 3—Delegates from Affiliated Societies at Scientific Meetings.

Two delegates from each affiliated society, one only of whom is required to be a Member of this Association, may attend the scientific meetings.

Section 4—Delegates from Affiliated Societies at Meetings of General Council

Two delegates from each affiliated society, provided one delegate is a Member of this Association, may be invited by the Executive Committee to attend meetings of the General Council. They may, at the request of the Chairman, take part in the deliberations but shall have no voting power.

CHAPTER IV.—ANNUAL MEETINGS

Section 1—Time and Place of Meetings

The time and place of meetings shall be decided by the General Council or the Executive Committee, and shall be announced as early as possible.

Section 2—Arrangements for Annual Meetings

When The Canadian Medical Association meets in any province where there is a Division, the meeting of that Division for that year shall be for business purposes only. The local arrangements shall be under the direction of the Executive Committee of The Canadian Medical Association, which may enlist the assistance of the Division or one of its component societies. The Canadian Medical Association assumes full control of the proceedings of the meeting and of all financial obligations save entertainment.

Section 3—Type of Programme

The programme of the meeting may consist of business sessions, general and sectional scientific sessions, and any other sessions which may be decided upon by the Executive Committee.

Section 4—Presiding Officer

The President or some person designated by him shall preside at all general meetings.

Section 5—Rules of Order

The Rules of Order which govern the proceedings of the House of Commons of Canada shall be the guide for conducting all meetings of The Association.

CHAPTER V.—MEETINGS OF SECTIONS

Section 1—Sectional Scientific Sessions

The Executive Committee shall determine what scientific Sections shall hold sessions at any annual meeting.

Section 2—Appointment of Sectional Officers

The Chairman and Secretary for each scientific Section shall be appointed by the Executive Committee.

Section 3—Presiding Officers at Meetings of Sections

The Chairman of the Section, or some one designated by him, shall preside at all meetings of the Section.

Section 4—Duties of Secretaries of Sections

The Secretary of the Section shall keep a correct record of the transactions, and shall transmit it to the General Secretary for insertion in the Minute Book provided for the purpose.

CHAPTER VI.—OFFICERS AND EXECUTIVE COMMITTEE

Section 1—Appointment of Nominating Committee

(*a*) The General Council at its first session at the time of the annual meeting shall elect by ballot from among its members present a Nominating Committee of NINE not including the President who shall be *ex officio* a member of the Committee and Chairman thereof.

(*b*) Each Division in The Association is entitled to nominate one member to the Nominating Committee. Provided this nomination be made in writing to the General Secretary prior to the annual meeting and the delegate so nominated be present he shall be declared elected to membership on the Nominating Committee.

(*c*) Upon completion of the election of Divisional Representatives as provided for in clause (*b*) of this section any vacancies which remain shall be filled by nominations from the floor, and the candidates so nominated who receive the highest number of votes shall be declared elected. This election shall be decided on a single ballot and the Chairman of the General Council shall if necessary give the casting vote.

Section 2—Duties of Nominating Committee

The Nominating Committee shall meet on the day of its election and submit to a later session of the General Council:—

1. Nomination of the following officers of The Association; a President-Elect, a Chairman of the General Council and an Honorary-Treasurer.

2. Nomination of an Executive Committee which, in addition to those who are members *ex officio* (See Chapter VIII, Section 4), shall consist of thirteen members geographically distributed as follows; three shall be resident in each province in which an office of The Association is located and one shall be resident in each of the other provinces.

At its session, the Nominating Committee may receive in writing a Division's official nomination of a candidate or candidates for representation on the Executive Committee to which the Division is entitled. In the event of an official nomination being rejected by the Nominating Committee the reasons for such action shall be incorporated in its report to General Council.

3. Rules of Procedure.—The Committee shall be called to order by the President as Chairman of the Committee. In the absence of the President the General Secretary shall convene the Committee and request the Committee to select, by open vote, the Chairman. The Committee shall then proceed to carry out its duties by open vote. In case of a tie vote the Chairman shall have the casting vote in addition to the vote to which he is entitled as a member of the Committee. When called for, the report of the Committee shall be presented to the General Council by the General Secretary.

Section 3—Election of Officers and Executive Committee

When the report of the Nominating Committee has been received by the General Council in session other nominations may also be received from the floor. A ballot shall then be taken for each of the offices in turn and also for elective members of the Executive Committee by provinces.

CHAPTER VII.—DUTIES OF OFFICERS

Section 1—Duties of the President

The President shall preside at the general sessions of The Association and shall perform such duties as custom and parliamentary usage require. He shall deliver a presidential address. He shall be a member *ex officio* of all committees of The Association. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

Section 2—Duties of the President-Elect

The President-Elect shall be installed and shall assume the office of President at the General Annual Meeting next following his election to the office of President-Elect. He shall be a member *ex officio* of all committees of The Association. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

Section 3—Duties of the Chairman of the General Council

The Chairman of the General Council shall preside at all meetings of the General Council. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association. He shall be a member *ex officio* of all Committees.

Section 4—Duties of the Honorary-Treasurer

The Honorary-Treasurer shall be the custodian of all moneys, securities and deeds, which are the property of The Association.

He shall pay by cheque only. Such cheques shall be signed by two persons authorized to sign cheques of The Association and shall be covered by voucher.

He shall prepare an annual financial statement audited by a chartered accountant.

He shall furnish a suitable bond for the faithful discharge of his duties. The cost of the bond shall be borne by The Association.

He may receive for his services an honorarium to be determined by the General Council. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

He shall be a member *ex officio* of the Executive Committee.

Section 5—Duties of the General Secretary.

The General Secretary shall be the Secretary also of the General Council and of the Executive Committee of The Association. He shall also be a member *ex officio* of all Committees of The Association. He shall give due notice of the time and place of all annual and special general meetings, by publishing the same in the official *Journal* of The Association or, if necessary, by notice to each member. He shall keep the minutes of the meetings of the General Council and of the Executive Committee in separate books and shall provide minute books for the secretaries of the different sections which he shall require to be properly attested by the secretaries thereof. He shall notify the officers and members of committees of their appointment and of their duties in connection therewith. He shall publish the official programme of each annual meeting. He shall perform such other duties as may be required of him by the President, the General Council or the Executive Committee. All his legitimate travelling expenses shall be paid for him out of the funds of The Association, and he shall receive for his services a salary to be determined by the Executive Committee.

CHAPTER VIII.—THE GENERAL COUNCIL

Section 1—Meetings of the General Council

The General Council shall meet for at least the first two days of the annual meeting of The Association, and thereafter, while The Association is in session, at the call of the Chairman. Before the close of the annual meeting it shall elect the officers and the Executive Committee and select the place for the next annual meeting, or, if thought advisable, for meetings up to three years in advance.

Section 2—Special Meetings of General Council

During the interval between annual meetings the General Council shall meet at the call of the Executive Committee. For all such meetings of the General Council due notice shall be sent to each member, stating the purpose of the meeting. The Executive Committee, if it so decide, instead of calling such meetings of the General Council may refer important questions to the General Council and obtain its decision by means of a mail ballot. In the event of a mail ballot being taken, two-thirds majority vote shall govern.

Section 3—Duties of the General Council

The General Council shall have supervision of all properties and of all financial affairs of The Association. It shall, through its officers, conduct all business and correspondence, and shall keep a record of all meetings and the receipt and expenditure of all funds, and shall report upon same in the *Journal* after the annual meeting.

Section 4—The Executive Committee may act for the General Council

In order that the business of The Association may be facilitated during the interval between meetings of the General Council the Executive Committee shall meet from time to time at the call of its Chairman, and shall have all the rights and powers of the General Council. It shall conduct all necessary business. In case of a vacancy in any office on account of death or otherwise it shall have power to appoint successors.

The President, the President-Elect, the Chairman of the General Council, the Honorary-Treasurer, the General Secretary, the Editor, and the Managing Editor shall be members *ex officio* of the Executive Committee, but only the elective officers shall have the right to vote.

CHAPTER IX.—COMMITTEES

Section 1—Duties and Powers of the Executive Committee

The Executive Committee shall hold one or more sessions before the close of the annual meeting at which it is elected. At its first meeting it shall elect its Chairman and appoint the Chairmen of the Standing Committees for the ensuing year. Between the meetings of the General Council, the Executive Committee shall represent the General Council in all its business affairs and shall exercise all the rights and powers of the General Council. The Executive Committee shall report to the General Council at the annual meeting and at such other times as the Chairman of the General Council may request.

The Executive Committee may meet when and where it may determine. On the request in writing of any three members (with voting power) of the Executive Committee, the Chairman shall call a special meeting. Five members (with voting power), exclusive of the Chairman, shall constitute a quorum for the transaction of business.

The Executive Committee shall be responsible for the appointment of the General Secretary, the Editor, the Managing Editor, the Associate Secretaries, and any other appointive officers, and shall fix their salaries.

The Executive Committee shall have charge of the publication of the official *Journal* of The Association and of all published proceedings, transactions, memoirs, essays, papers and programmes of The Association.

The Editor and Managing Editor shall present annual reports to the General Council and interim reports at each meeting of the Executive Committee. The Editor shall be reimbursed for legitimate travelling expenses incurred on Association business.

The Executive Committee may appoint Editorial Boards to assist the Editors.

The Executive Committee shall appoint the auditor and shall have the accounts of the Honorary Treasurer audited annually, or more often if desirable, and shall make an annual report on the same to the General Council.

Each member of the Executive Committee shall be reimbursed for legitimate travelling expenses incurred in attending meetings of the Executive Committee other than the first meeting or meetings of the New Executive Committee, which may be held before the close of the annual meeting.

Section 2—Committee on Legislation

Matters relating to medical legislation, Federal or Provincial, and matters requiring legislative action arising within The Association, may be referred by the Executive Committee to the Committee on Legislation for consideration and advice.

Section 3—Committee on Medical Education

To the Committee on Medical Education shall be referred all matters pertaining to medical colleges and medical education. It shall report upon the condition of medical education throughout Canada and upon any proposed change, and may suggest methods for the improvement of medical education.

Section 4—Post-Graduate Committee

To the Post-Graduate Committee may be delegated the responsibility of carrying out the post-graduate plans of The Association.

Section 5—Committee on Programme

This Committee, with the assistance of the Chairman and Secretary of each scientific section, shall have complete charge of the preparation of the scientific programme for the annual meeting.

Section 6—Committee on Constitution and By-Laws

To the Committee on Constitution and By-Laws shall be referred all matters relating to the subject before action thereon is taken by the General Council.

Section 7—Committee on Archives

The Committee on Archives shall be responsible for collecting as far as possible (*a*) the obituaries of members dying since the last annual meeting; (*b*) all documents and information relating to the various members and activities of The Canadian Medical Association which are deemed worthy of preservation. The Editor of the *Journal* shall be a member *ex officio* of this Committee.

Section 8—Committee on Public Health

It shall be the duty of this Committee to study and report upon all matters of Public Health which, in the opinion of the Committee, should engage the attention of The Association. To the Committee may be delegated such duties in relation to Public Health as in the opinion of General Council or Executive Committee should be undertaken by the Committee on behalf of The Association.

Section 9—Committee on Ethics and Credentials

To this Committee all matters of ethics and special questions of credentials shall be referred for consideration and report to the General Council or the Executive Committee.

Section 10—Committee on Economics

It shall be the duty of the Committee on Economics, excepting where otherwise provided, to deal with (*a*) social legislation which includes medical services or benefits presumably for medical services; (*b*) remuneration and employment of physicians by lay bodies, hospital or official bodies, including Federal, Provincial and Municipal Governments; (*c*) to report thereon with such recommendations as it may see fit to the General Council.

Section 11—Committee on Pharmacy

It shall be the duty of the Committee on Pharmacy to deal with (*a*) all matters arising out of the British Pharmacopœia or any Canadian Formulary or Pharmacopœia; (*b*) all matters arising out of the drug section of the Food and Drugs Act, the Narcotic Act, or the Patent and Proprietary Medicine Act; and (*c*) any inquiries from members of The Association relating to the use of standards of drugs.

Section 12—Hospital Service Committee

This Committee shall act in an advisory capacity to the Hospital Service Department of The Association.

Section 13—Committee on Cancer

To this Committee shall be referred all matters relating to the study and control of cancer.

Section 14—Special Committees

Each Special Committee shall assume, by direction, such duties as are allotted to it, and shall make progress reports to the Executive Committee at each of the meetings of that body or at any other time that such reports may be required by the President, the Chairman of the General Council, or the Executive Committee.

Section 15—Reports of Committees

Reports of all Committees shall be printed and mailed to all members of the General Council at least one week before the annual meeting.

Section 16—Limitations of Committees re Finances

No Committee shall expend any moneys or incur any indebtedness or obligation on behalf of The Association without the sanction of the General Council or the Executive Committee.

CHAPTER X.—ADDRESSES AND PAPERS

Section 1—Addresses at Annual Meeting

All addresses delivered at an annual meeting shall immediately become the property of The Association, to be published or not, in whole or in part, as deemed advisable, in *The Journal* of The Association.

Any other arrangements for their publication must have the consent of the author or of the reader of the same and of the Editor of the *Journal*.

Section 2—Publication of Papers Presented at Annual Meeting

All papers, essays, photographs, diagrams, etc. presented in any section shall become the property of The Association, to be published in the *Journal* of The Association or not, as determined by the Editor, and they shall not be otherwise published except with the consent of the author and of the Editor of the *Journal*.

Section 3—Disposition of Papers Presented at Annual Meeting

Each author of a paper read before any section shall, as soon as it has been read, hand it with any accompanying diagrams, photographs, etc., to the Secretary of the Section before which it has been presented. The Secretary shall endorse thereon the fact that it has been read in that Section, and shall then transmit it to the Editor of the *Journal*.

CHAPTER XI.—PROVISIONS FOR DISCIPLINE

Section 1—If any Member of The Association, after due inquiry by the Executive Committee shall be judged to have been guilty of disgraceful conduct in any professional respect, he shall be liable to censure, suspension or expulsion from membership in the Association by resolution of the Executive Committee, confirmed by a three-fourths vote at the next annual meeting of General Council.

Section 2—Should any Member of The Association be convicted of any criminal offence, or have his name removed from the register of the Medical Council of

Canada, or of the licensing body of any Province of Canada, because of felonious or criminal act, or disgraceful conduct in any professional respect, the Executive Committee, may, by resolution, confirmed at the next ensuing annual meeting of the General Council, by a three-fourths vote of those present, censure, or suspend or expel such person from membership in The Association.

Section 3—Any Member suspended or expelled by resolution as aforesaid shall thereby forfeit all his rights and privileges as a Member of The Association.

Section 4—Any Member suspended or expelled by resolution as aforesaid shall, subject to conditions imposed by the Executive Committee, be restored to membership upon resolution of the Executive Committee, confirmed at the next ensuing annual meeting of General Council.

Section 5—By subscribing to the application for membership under the terms of the By-Laws and Code of Ethics (See appendix) and becoming a Member of The Association, every Member attorns to these By-Laws, and agrees to such right of discipline as aforesaid, and thereby specifically waives any right or claim to damages in the event of his being so disciplined.

CHAPTER XII.—AMENDMENTS

1. Notice of Motion by one or more Members, to amend the By-Laws, must be placed in the hands of the General Secretary three months before the date of the annual meeting.

2. Amendments may be proposed by the General Council, the Executive Committee, or the Committee on Constitution and By-Laws without notice of motion, but the proposed amendments shall be published in *The Journal* in two issues preceding the annual meeting.

3. The By-Laws shall be amended by a two-thirds vote of the members of the General Council in session present and voting.

NOTE: Throughout these By-Laws, masculine designations are to be interpreted as including feminine.

At the meeting of the Executive Committee held in Toronto on April 15 and 16, 1938, the following resolution was adopted.

WHEREAS the Committee on Constitution and By-Laws has presented a revision of the Constitution and By-Laws applicable to Divisions; and Whereas amendments to the Constitution and By-Laws must be published twice in the *Journal* before being considered by the General Council in annual session; Be it resolved that the Executive Committee now authorize the present draft to be published in the *Journal*, in the issues of May and June, 1938; and further, that the Executive Committee now give Notice of Motion that, at the Annual Meeting in 1938, a resolution will be presented proposing that the Constitution and By-Laws for Divisions, as may be adopted, and the Constitution and By-Laws of the Association, as at present existing, be consolidated.

Unless an orator's defects are mentioned by someone his good points will not be praised. Be not proud of the beauty of thy speech, of the approbation of an ignoramus, and of thy own opinion.—*Maxim XXXI* of the Sheik Sa'di of Shiraz.

Whoever does not listen to advice will have occasion to hear reproof. If admonition enters not thy ear, be silent when I blame thee.—*Maxim L* of the Sheik Sa'di of Shiraz.

Hospital Service Department Notes

Canadians Discouraged From Taking Internships in Pennsylvania

A situation has developed in Pennsylvania which is of interest to those graduating from Canadian medical schools, although the regulations in question are not primarily directed against those Canadian graduates who take, or would take, internships in hospitals in that state. The State Board of Medical Education and Licensure has threatened to remove certain hospitals in Pennsylvania from the list of hospitals approved for intern training unless they cease to enrol interns who expect to practise in states other than Pennsylvania. This involves the question of legal responsibility and licensure, which frequently arises with respect to interns. It is pointed out by the hospitals, which apparently are opposed to this development, that the recent amendment to the Medical Practice Act in Pennsylvania states that it "shall not apply to anyone while actually serving as a student intern under the supervision of the medical or surgical staff of any. . . hospital". Furthermore, the employment of interns, even though such do not assume individual responsibility, is being forbidden to those hospitals which are not approved for intern training. They will be required to employ licensed physicians to replace the resident interns now training under the supervision of staff physicians.

It is ruled also that an intern who has completed his regular internship in an approved hospital cannot take a second period of intern training, even in an approved hospital, without first obtaining the state license to practise.

These rulings of the State Board are of concern in view of the legal requirement that all hospitals of 100 beds or over receiving state grants shall at all times have in attendance either a licensed physician or a resident intern. Whether or not these interpretations of the State Board are violations of existing legislation and usurp the legislative authority of the State is being warmly contested, but it seems obvious that these rulings do restrict medical education for those students intending to practise elsewhere and limit or prohibit optional internships in the specialties. It is stated that they limit the functions of the graduate schools of medicine in Pennsylvania. Until the matter can be settled, the Board is warning hospitals and interns of the penalties for violation of these regulations, and the hospitals, on the other hand, have been advised to disregard those orders of the Board which are not compatible with the legal acts of the state legislature.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

Medical Societies

The Saskatchewan College of Physicians and Surgeons

The thirty-first annual meeting of the Saskatchewan College of Physicians and Surgeons, August 1st, 2nd and 3rd, will be held at Lake Waskesiu.

Lay aside all care and point your cars north where there is neither smoke nor dust in the air and where the telephone never rings.

Accommodation is plentiful and ranges from good hotels for the tenderfoot to shack tents for the outdoor boys. There is not a dull paper on the scientific program nor a slow moment in the social hours. Come to Waskesiu for scientific education, golf on the West's most beautiful course, and good fellowship with the world's friendliest doctors.

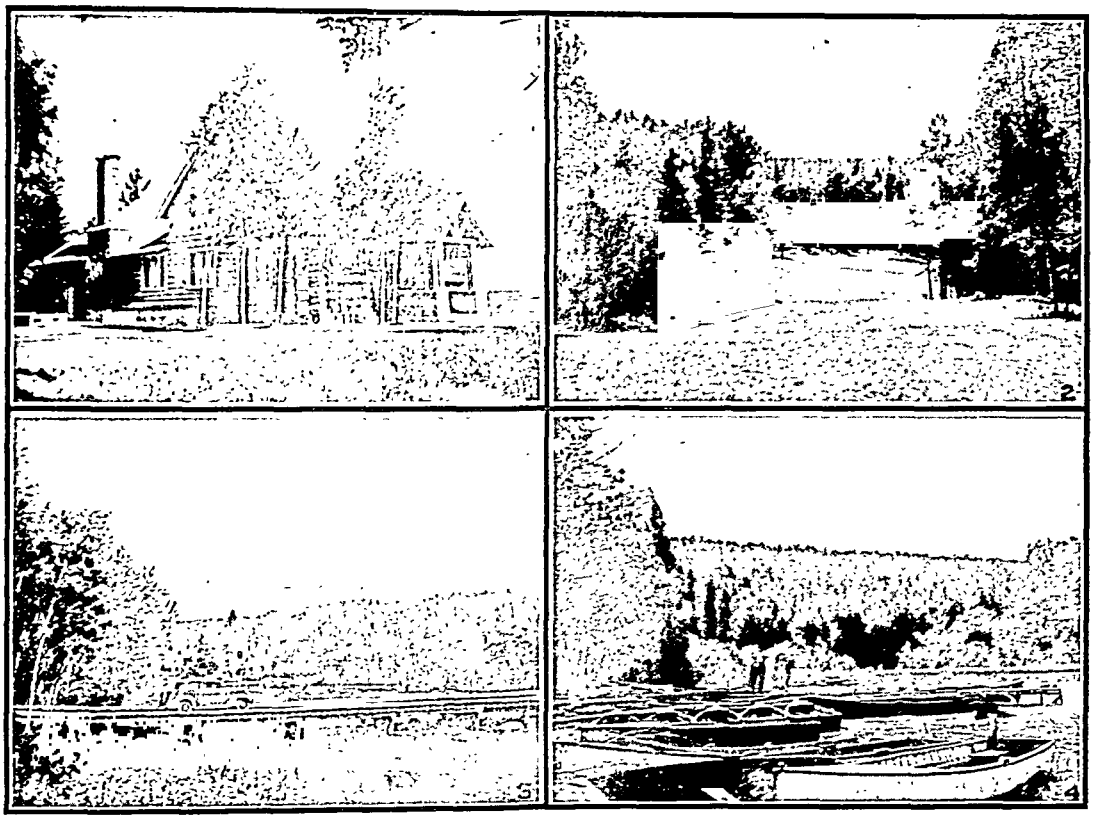


Fig. 1.—Club house at Lake Waskesiu. Fig. 2.—Fairway, Lake Waskesiu. Fig. 3.—A motor road, Lake Waskesiu. Fig. 4.—At the end of the portage, Hanging Heart Lake, Prince Albert National Park.

The Montreal Physiological Society

STUDIES OF BLOOD FLOW IN EPILEPSY.—Wilder Penfield. (Abstract of a paper read on February 21st).

A brief presentation was made of the methods used during the past three years for the study of the circulation and between seizures in epileptic patients. Apparatus was described which enabled photographs of the brain to be made during operation, the photographer being outside the operating room and, working through mirrors. Dr. Erickson had made electrocardiograms during seizures, using apparatus designed to damp out disturbances due to contraction of the skeletal muscles. No significant abnormality had been found.

Changes in the cerebral blood flow were measured by Gibbs' thermo-couple method. The minute thermo-couple could be placed directly in the cortex exposed at operation. The recording apparatus was handled by Mr. Cipriani in an adjoining room. Epileptic seizures were associated with marked increase of blood flow which spread gradually over the cortex. The spread probably corresponded with the spread of the epileptic discharge. The increase was sometimes preceded by a momentary decrease of blood flow. The apparatus was demonstrated at the close of the presentation.

THE MEASUREMENT OF BLOOD FLOW. — A. Cipriani. (Abstract of a paper read on February 21st).

In the measurement of blood flow the thermo-electric method of Gibbs is employed. The basic principle of the method lies in the introduction of a small temperature gradient into the tissue under observation—in our case the brain or spinal cord. A small portion of the tissue is heated electrically to a temperature of about 6° C. above that of the circulating blood. The final temperature attained is the resultant of two factors—the heat introduced electrically, which is kept constant, and the heat removed by the blood flowing through the region. If the cooling effect of the blood is increased the temperature of the region falls; if the cooling effect of the blood is decreased the temperature of the region rises. These temperature changes are recorded via a thermo-couple which is an integral but not electrical part of the heating unit. Such variations serve as a qualitative index of the blood flow in the region.

There are some observations by Santha and Cipriani which best illustrate this method of observing blood flow. Here the heated thermo-couple was placed in some subcortical centre of the cat, and the lateral surface of the cortex stimulated electrically. It was found that stimulation of some local region of the cortex resulted in a blood-flow increase in a sub-cortical centre. The relation between cortex and subcortical centres bore a striking resemblance to the projections found by anatomical methods.

STUDIES OF NEUROMUSCULAR DISORDERS. — Donald McEachern. (Abstract of a paper read on February 21st).

Cases of myasthenia gravis, progressive muscular dystrophy, etc., had been studied. A rotating stimulator had been constructed which was capable of delivering shocks at rates varying from 30 to 840 per second. At high rates of stimulation of the motor point of the ulnar nerve myasthenics had shown a consistently abnormal twitch-like response. This was not due to fatigue, and it was abolished by prostigmine. The method had been of diagnostic help in one case and in following the results of treatment in others.

Ammon's manometric method for determining acetylcholine esterase was described. Blood cells and serum from myasthenics showed esterase activity which fell within the wide limits for normal individuals, but the variations from day to day were greater in a myasthenic patient than in a normal person. Prostigmine rapidly lowered the esterase in degree proportional to the dose. Demonstrations were later given of the variable frequency stimulator and of methods for the estimation of acetylcholine and of acetylcholine esterase.

Through the courtesy of the Director of the Neurological Institute the members of the Society had an opportunity to see a demonstration of the laboratory methods in vogue at the Institute.

The Regina Grey Nun's Hospital

Dr. J. B. Trudelle presented the following case at the Regina Grey Nun's Hospital staff meeting on March 21st.

A man, aged 63, for the past four years had had repeated attacks of dizziness, dimness of vision, partial loss of consciousness, and on one occasion was admitted to hospital thought to be in a state of uræmic coma. He had a moderate hypertension (163/90) and generalized arteriosclerosis. During the last six weeks in hospital the blood urea was only 24 mg. per 100 c.c. The patient was continuously in a semi-comatose state, showing no signs of paralysis or paraplegia, but both eyes were fixed in the left upper position. Post-mortem examination by Dr. Eric Massig revealed an extensive cerebral arteriorsclerosis, with massive and widespread cerebral softening involving the entire left occipital lobe, as well as innumerable tiny patchy areas of necrosis throughout the white matter and basal ganglia of both cerebral hemispheres. Dissection of the arteries revealed marked stenosis of all branches, with thrombosis of the terminal portion of the left cerebral artery. The kidneys did not show arteriosclerotic or nephritic change, and were entirely normal as to excretory function for a person of his age. An interesting finding was a healed infarct of the anterior portion of the intraventricular septum and adjacent myocardium of the left ventricle. LILLIAN A. CHASE

Abstracts from Current Literature

Medicine

Gastric Acidity after Gastro-Enterostomy. Holman, C. and Sandusky, W. R.: *Am. J. M. Sc.*, 1938, 195: 220.

The authors have investigated the gastric acidity in 75 patients prior to and following posterior gastro-enterostomy. All the patients suffered from peptic ulcer. In 92 per cent the gastric acidity was not appreciably altered by this operative procedure. Those who had hyperacidity before operation continued to show high values even when tested long after operation. In 8 per cent the acidity was diminished to below normal, but in only one patient did it reach a complete anacidity. The authors therefore conclude that some factor

other than the alteration of the gastric acidity is responsible for the relief derived from this operation in patients with peptic ulcer. It therefore follows that pre-operative or post-operative acidity cannot be used in the prognosis of the therapeutic effect of gastro-enterostomy.

E. S. MILLS

Macrocytic Anæmia in Cancer of the Stomach, apparently due to Lack of Intrinsic Factor. Goldhamer, S. M.: *Am. J. M. Sc.*, 1938, 195: 17.

The author reports the case of a 63-year old farmer who suffered from a severe macrocytic anæmia which responded to treatment by dessicated stomach tissue. The hæmogram was considered to be typical of pernicious anæmia, and the patient's gastric juice was shown to contain no intrinsic factor by means of the therapeutic test. No evidence of subacute combined sclerosis of the cord was obtained on physical examination. The patient's father had died from pernicious anæmia. Subsequent to the successful treatment of his anæmia the patient became emaciated and cachectic, and x-ray studies demonstrated a carcinoma of the stomach of the linitis plastica type. The author believes that the macrocytic anæmia, thought primarily to be due to idiopathic pernicious anæmia, resulted from the failure of the cancerous stomach tissue to produce the necessary intrinsic factor, or from the destruction of the latter by the malignant tissue or its toxin.

E. S. MILLS

Surgery

Crohn's Disease, or Regional Ileitis. Barrington-Ward, Sir L. and Norrish, R. E.: *Brit. J. Surg.*, 1938, 25: 530.

The authors consider this to be a new disease. The pathological appearance at operation was something they had never seen before. The affected loop was thick, solid, fat predominating; the mesentery red, œdematous, infiltrated, with masses of swollen glands in its substance. This may occur in other places than in the terminal ileum. The cæcum and ascending colon are commonly involved. The cause is unknown. Both sexes are affected. The age incidence varies between 70 and below 10 but it is more common below the age of 40. Lymphatic obstruction, low-grade lymphatic infection, tuberculosis, *B. dysenteriæ*, various streptococci, and anatomical abnormalities have been thought to be the cause.

Clinical and pathological features of the disease are described in four stages, to a fatal termination. The first is the early or acute stage suggestive of appendicitis. "A small segment of reddened and thickened bowel is found often close to the ileocæcal angle with a clear peritoneal exudate." In the second stage mucosal ulceration takes place, suggesting colitis. Bacterial examination is consistently negative. In the third stage the lumen of the bowel narrows and symptoms of obstruction predominate, *e.g.*, colicky pains, nausea, vomiting, constipation and diarrhœa. In the fourth stage there are adhesions, fistula, abscesses.

The course of the disease is from a few months to two or three years. Progressive secondary anæmia, wasting and weakness are present. The leucocyte count is 12,000 or 15,000. Resolution sometimes takes place if the disease has not advanced too far. X-ray appearances early are loss of segmentation and peristalsis in the lower ileum. Later there is a filling defect and often a tapering of the shadow towards the cæcum. Fixed and permanent deformity in the proximal large bowel indicate that the disease has spread distally. The third stage shows dilated small bowel above and a thin line through the affected loop called the "string sign of Kantor". Though not pathognomonic, this is very suggestive.

Treatment consists in radical resection of the affected loop. Palliative treatment is of value in the early cases. Some advocate ileo-colostomy and resection later at a second stage only if necessary. The best results are from extirpation, but the author favours conservative treatment in early cases. Two cases are reported. Both of these had radical resections done.

S. A. MCFETRIDGE

Impalement of the Rectum. Conway, F. M.: *Surg., Gyn. & Obst.*, 1938, 66: 222.

Two types of this injury are readily recognized. The "pure type" in which the object passes directly through the anus usually results in perforation of the anterior wall of the rectum and small intestine unless impingement upon the sacral promontory occurs. Barium x-ray examination is inadvisable and proctoscopic examinations are inconclusive. The "atypical impalements" involve primarily the peri- and para-rectal tissues before perforation of the anterior wall of the rectum occurs. The involvement may remain extraperitoneal and is less commonly intraperitoneal, with perforation of the small intestine and any of the other abdominal viscera, with the urinary bladder as the most frequent. Hæmorrhage, hæmatoma, abscess and fistula are the complications of the extraperitoneal type. Proctoscopic examination is rarely conclusive. Exploration of the extraperitoneal, with packing, and the consideration of colostomy is advised. The intraperitoneal demand laparotomy.

FRANK DORRANCE

Obstetrics and Gynæcology

A Study of 285 Cases of Breech Delivery. Danforth, W. C. and Galloway, C. E.: *Am. J. Obst. & Gyn.*, 1938, 35: 123.

The fetal mortality attending breech delivery is far greater than that of deliveries in the

cephalic position. About the end of the eighth month a breech presentation should be changed to cephalic by external version if possible. Only moderate force should be used and no anæsthesia. In delivery conservatism is the wisest course, withholding operative intervention until an indication develops. The mortality rate is smallest in infants weighing five pounds or more. The mortality of breech delivery at term in skilful hands should be less than 10 per cent. Cæsarean section occupies a definite place in the management of breech presentation, especially in primiparas, but it should be reserved for those cases in which an adequate indication exists. ROSS MITCHELL

Lower Abdominal Pains of Cervical Origin, their Genesis and Treatment. Young, J.: *Brit. M. J.*, 1938, 1: 105.

The cervical syndrome is found predominantly in parous women. The main indications are chronic distress and pain in the lower abdomen or lumbo-sacral region, dyspareunia and leucorrhœa. There is an absence of gross pelvic disease. Chronic ill-health is a common end-result.

In a typical case the chief site of pain and tenderness is in the iliac fossa, especially the left. The pain exhibits itself as spontaneous pain, local tenderness, and well-localized excitation pain. The spontaneous pain may consist of an aching, ever present during the waking hours, or more commonly of a pain which comes and goes and is aggravated before menstruation and during exertion. It is associated with local tenderness, in many cases restricted to a segment about two inches square, lying below and external to the umbilicus. There is generally an associated hyperalgesia of the skin, but muscular rigidity is typically absent. Pressure on the cervix at once excites pain in an acute and well-localized form in the same area.

Mesial visceral pain is expressed in two clinical forms: (*a*) a spontaneous discomfort or actual pain vaguely located in the retropubic area and lower mesial abdomen, and (*b*) pain felt immediately when the finger placed in the vagina exerts pressure against the cervix.

Treatment of the condition is local and the blockage of the pelvic nerves. The routine local treatment is the dilatation of the cervix, radial incision of the infected area with the electric cautery, and deep puncture of the tissues, including evacuation of the gland cysts. Blockage of Frankenhauser's plexus is effected by the injection into the base of the broad ligament along the side of the cervix of 5 to 10 c.c. of 85 per cent alcohol. Recently proctocaine (benzyl alcohol 5 per cent, butyl-p-aminobenzoate 6 per cent, olive oil to 100 per cent) has been used with gratifying results.

The lower abdominal pains caused by the infected cervix may be confused with subacute and chronic salpingitis, endometrioma and chronic pelvic appendicitis. ROSS MITCHELL

Cæsarean Section. Fraser, J. R. and Sparling, D., *Surg., Gyn. & Obst.*, 1938, 66: 437.

The incidence of Cæsarean section is too high. While it is admitted that Cæsarean section for the classical indications of pelvic disproportion or obstruction, under ideal conditions, can be made a relatively safe operation it is in actual practice associated with a very definite mortality. The broadening of the indications for the operation has definitely increased the risk for both mother and child. The low cervical operation has tended to decrease the risks in the presence of labour or potential infection, but has not removed them entirely. Many women being subjected to Cæsarean section today would be more suitably dealt with by more conservative obstetrical measures. ROSS MITCHELL

Ophthalmology

Mechanism and Pathogenic Value of von Graefe's Sign. Voisin, J.: *Ann. d'Ocul.*, 1937, 174: 666.

The study of the movement of the upper lid in looking downwards may bring into evidence two kinds of pathological changes. One is rare, and thus it is proposed to call a paradoxical raising of the upper lid which Fuchs has described under the name of the pseudo-sign of von Graefe, in the course of repair of certain paralyses of the third nerve. The other is the sign of von Graefe, which is generally looked for in Graves' disease. This sign, contrary to the classical opinion, may be met with in the course of syndromes in which the sympathetic is not manifestly the cause.

To appreciate the value of von Graefe's sign we should first of all study the physiological mechanism of the associated movements of the globe and upper lid looking downward, as it is in this movement that the symptom is determined. The mechanism of these movements is far from being completely clear.

The presence of von Graefe's sign permits of a diagnosis of hypertonia of the muscles of the lid, but it does not give any information as to the cause of this hypertonia.

S. HANFORD MCKEE

The Clinical Significance of the Retinal Changes in the Hypertensive Toxæmias of Pregnancy. Gibson, G. G.: *Am. J. Ophth.*, 1938, 21: 22.

The first physical sign of early pre-eclampsia is attenuation of the nasal retinal arterioles. This is usually concurrent with slight elevation of the diastolic blood pressure. The great majority of these cases do not become sufficiently severe to progress further than this stage; they will usually respond to medical

treatment, as suggested by Arnold. If they do, the patient will be left without a demonstrable vascular lesion. In a small percentage of the cases, however, the disease is much more fulminating and treatment must be heroic. The earliest and most reliable signs of the severe course of these conditions is the appearance of the retinal arterioles. The severe changes in the retinal arterioles usually precede the clinical criterion of severity. The appearance of hæmorrhages and exudates associated with hypertensive vascular change in the retinal arterioles is a reliable sign for the therapeutic termination of pregnancy. Proper interpretation of these changes will materially reduce the vascular damage done to the mother, and reduce the incidence of fetal and maternal mortality.

S. HANFORD MCKEE

A Case of Intra-Ocular Neuroma (von Recklinghausen's Disease) of the Left Optic Nerve Head. Stallard, H. B.: *Brit. J. Ophth.*, 1938, 22: 11.

Von Recklinghausen's disease is congenital, slowly progressive, and affects males more commonly than females. Ocular complications are sometimes present. The characteristic pathological changes are confined to and diffused throughout the distribution of one or more contiguous nerves or a plexus of nerves. In the orbit the branches of the first division of the fifth become enlarged and convoluted, and on palpation of the orbital contents they give the impression of feeling like a bag of worms. The eye on the affected side is proptosed and displaced, often downward and forwards. Ptosis is evident and the skin of the lids is hypertrophied. In some cases the affected area of skin is very hairy and pigmented. The skull is enlarged, brachycephalic, and the foramina through which the diseased nerves pass are grooved and enlarged.

The report consists of a case of neuroma affecting the optic nerve head of the left eye in a young man of 19 years. The histopathology of the neoplasm is described. Three years after the disease had been discovered in his left eye, he developed signs of raised intracranial pressure from a neoplasm, or probably several neoplasms inside the skull. A subtentorial decompression was followed two days later by death.

S. HANFORD MCKEE

Urology

Clinical Data Concerning Chronic Pyelonephritis. Braasch, W. F.: *J. Urol.*, 1938, 39: 1.

From a review of the clinical data in a series of 200 cases of chronic pyelonephritis it was demonstrated that although pathological changes resulting from the presence of various types of bacteria are in general similar, yet there are certain characteristics typical of some of the more resistant types of infection. *B. Aerogenes* often will cause a greater degree of infection and involvement of renal tissue with deformity than its cousin the colon bacillus. In fact, a greater degree of urographic deformity is observed more often with *Aerogenes, Pseudomonas,* and *Proteus* than with other bacteria. Although all bacteria may cause mild symptoms and but little deformity, yet this type of infection is observed relatively more often in the presence of cocci than of other bacteria. The incidence of amicrobic pyurias is quite high, and in many instances this is due to the fact that the bacteria have become so indolent and scattered that they fail to appear in culture. Anaerobic bacteria are only occasionally of etiological importance. Lithiasis secondary to chronic pyelonephritis is a distinct type of renal lithiasis and occurred in 5 per cent of cases. All types of bacteria may be concerned and the pH of the urine is usually in the range of neutrality. Hæmaturia occurred in 12 per cent of cases, the majority being associated with infections of the *Aerogenes* and colon bacilli types. As renal stasis and obstructive factors seldom complicate these chronic infections surgery is rarely employed. Recovery is spontaneous in about 20 per cent of cases. The author comments upon the very fine international cooperation in the solution of problems of treatment of renal infection, and highly recommends mandelic acid and sulfonamide therapy.

J. V. BERRY

Neurology and Psychiatry

Intracranial Tumours of Sisters, Occurring at Approximately the Same Age and Presenting Similar Syndromes. Craig, W. McK.: *Proc. Staff Meet. Mayo Clinic.*, 1937, 12: 798.

The two patients here reported were the fourth and sixth children in a family of ten children; no others had similar histories. The first girl complained of intense headache, projectile vomiting, and progressive loss of vision. Examination showed choked discs, internal hydrocephalus, blocking of the third ventricle, and calcification in the region of the third ventricle with erosion of the sella turcica. Diagnosis of a craniopharyngeoma of Rathke's pocket was made. At operation a cyst was removed, and the microscopic diagnosis was adamantinoma of Rathke's pocket. The patient died four days later, and autopsy revealed that not all of the tumour had been removed, some of it being adherent to the large vessels.

Three years later a younger sister noted progressive loss of vision for which glasses gave no improvement. Two years after the failure of vision intense frontal headaches began, and this symptom recalled to the parents the disease of the older sister. Examination showed no increased intracranial pressure, but erosion of the sella was present. A diagnosis of supra-

sellar cyst was made, but at operation no cyst was visible. The optic nerves were swollen and the optic chiasm three times its normal size. A small piece of tissue was removed and found to be a very cellular astrocytoma. The patient made an uneventful recovery, but with no change in visual acuity. She was given one course of roentgen therapy. It is of interest that with rarity of intracranial tumours in general as compared with other types two sisters should have presented such similar subjective and objective symptoms and signs when the two girls were approaching adolescence.

MADGE THURLOW MACKLIN

Therapeutics

Critical Anaphylactic Shock. Joyce, J. S.: *Arch. Int. Med.*, 1937, 60: 974.

After referring to the tragedy of fatal anaphylactic shock during the routine treatment for a condition never fatal itself the author reports an experience of his own. While giving antigen desensitization treatment for ragweed hay fever and asthma he had reactions after the first and ninth doses—severe but not dangerous. After the 23rd treatment, which, it is interesting to note, repeated the dose of the 22nd, the patient had a reaction which seemed certain to prove fatal. Unconsciousness, absence of both respirations and pulse were present along with a generalized tonic convulsion. All this happened in less than a minute and progressed in spite of several hypodermics of adrenalin. One c.c. of adrenalin intracardially produced a response. Oxygen was given and two more intracardial injections of adrenalin at intervals of five minutes, along with other injections of this substance in both arms. Recovery finally took place, assisted by intravenous saline. The patient remained cyanosed for twenty-four hours and was not normal for several days. One important point was the massive dosing with adrenalin without any serious reaction. The author observes that in many cases of anaphylaxis that resulted fatally either no adrenalin or insufficient quantities were used, and that the intracardial administration was often not used, although as much as 10 c.c. has been given intracardially with no harmful effects and followed by recovery.

P. M. MACDONNELL

Experience with Sulphanilamide in Meningitis. Neal, J. B. and Applebaum, E.: *Am. J. M. Sc.*, 1938, 195: 175.

These authors have used sulphanilamide in cases of meningitis due to the hæmolytic streptococcus, the pneumococcus, the meningococcus and the influenza bacillus. The preparations used have been prontosil intramuscularly, prontylin orally, and at times an 0.8 per cent solution of prontylin crystals intraspinally. The dosage given was 5 c.c. or less of prontosil every four hours to younger children, and 10 c.c. every 4 hours to older children and adults. In addition 5 to 15 grains of prontylin were given every 6 hours. When prontylin crystals were used intraspinally they were dissolved in warm saline and the solution allowed to run in by gravity.

Seventeen cases of hæmolytic streptococcic meningitis secondary to infections of ears, mastoids or sinuses, were so treated with "astounding" results. Thirteen of the 17 patients recovered completely and 4 died. Of the fatal cases 2 were of relatively long duration and the subjects died within 24 hours after starting treatment by the drug. One was complicated by a spindle-cell sarcoma of the pituitary body, and the fourth, adequately treated, had extensive sinus thrombosis. These results are compared with a mortality of 259 out of 274 cases up to the end of the year 1936. During the year 1936 there were 20 cases of hæmolytic streptococcus meningitis with only one recovery.

Of fourteen cases of pneumonococcic meningitis treated with sulphanilamide recovery occurred in only three. None of these received antipneumococcic serum. Sulphanilamide was used in meningococcic infections only as a supplement to specific serum. The authors' cases were few in number, and the results inconclusive. One case of influenzal meningitis recovered after treatment by sulphanilamide alone.

The authors emphasize the importance of eradicating any primary focus of infection in addition to the use of the drug. As regards other therapeutic measures proper attention to an adequate fluid intake and elimination are considered important. Adequate drainage of the subarachnoid space by means of repeated lumbar punctures is stressed. More radical methods of establishing drainage, such as laminectomy, trephining the cisterna magna, and forced spinal or perivascular drainage are not recommended.

E. S. MILLS

The Insulin-Hypoglycæmia Treatment of Schizophrenia: Results in Treated and Untreated Cases. Rosenberg, E. F. and Moersch, F. P.: *Proc. Staff Meet. Mayo Clinic*, 1938, 13: 113.

Thirty-three patients with schizophrenia have been treated by the method of insulin hypoglycæmia at Rochester State Hospital. For each such patient treated by insulin data from records of similar types of patients not treated with insulin have been compared. The compared patients were of the same sex and age-group, and of the same duration of psychosis. Cases of similar educational background were chosen.

Of the group of 33 patients treated with insulin hypoglycæmia, 5 improved markedly and 3 slightly. Two of the patients who improved markedly have since had recurrence of schizophrenic symptoms. Of the thirty-three patients in the group who were treated by the usual methods, 11 eventually improved sufficiently to

justify their dismissal from hospital; 1 had sufficient improvement to permit parole to his relatives.

Experience with insulin has demontrated that treatment appears to be of little avail in chronic cases of schizophrenia. The enthusiasm with which forms of shock-therapy have been recommended in the treatment of schizophrenia will, therefore, have to be modified.

The shock-therapy has given an impetus to the belief that schizophrenia is a curable disease, and that the physiochemical approach to the problem justifies continued study.

LILLIAN A. CHASE

Pathology and Experimental Medicine

A Study of Tuberculous Splenomegaly and Splenogenic Controlling of the Cell Emission from the Bone Marrow. *Engelbreth-Holm, J.: Am. J. M. Sc.*, 1938, 195: 32.

The author has studied 4 cases of tuberculous splenomegaly with special reference to the effect of the diseased organ on bone-marrow function. Tuberculous splenomegaly, sometimes termed primary tuberculosis of the spleen, is comparatively rare, only 80 cases having been reported in the medical literature of the world. The disease is rarely if ever recognized prior to operation or autopsy. The chief clinical features are weakness, lassitude, and loss of weight, with anæmia, leucopenia, and a greatly enlarged spleen. Death results in from six months to fourteen years unless the organ is removed.

In the author's 4 cases splenectomy was performed in three. One died of thrombosis of the portal vein, and two lived and improved after operation. The author's thesis and conclusions are based largely on case 2, which was studied carefully before and after splenectomy. These studies included sternal bone-marrow studies before and after operation. The latter studies showed normal numbers of marrow cells in the sternal marrow, both before and three and one-half months after splenectomy. Striking changes were noted, however, in the proportion of mature cells in the marrow at the second tap. Before splenectomy there were 36.5 per cent erythroblasts, with many immature cells of the granular series, and only 17 per cent segmented neutrophiles with 5 mitoses per 500 cells. After splenectomy there were only 13.7 per cent erythroblasts, with few immature granular cells, and 31.3 per cent segmented neutrophiles. Only one mitotic figure occurred per 500 cells. In summary, the marrow punctures showed that splenectomy had little effect upon the number of cells found in the marrow, but this procedure resulted in a much higher proportion of mature cells ready for delivery to the circulating blood. Further, with this shift to the mature side there occurred fewer mitoses. Two other significant features were noted. Immediately following splenectomy a temporary increase in marrow cells was noted in the peripheral blood. Finally, histological studies of the removed spleen showed a marked increase in reticulum tissue.

From these observations the author believes that tuberculous splenomegaly and other types of splenomegaly associated with reticular increase, as Banti's disease, Gaucher's disease, and malaria, cause anæmia, leucopenia and thrombopenia, not through inhibition of production, since the cell count on the marrow is normal, but rather through inhibition of the emission or of the maturation of the blood cells in the bone marrow. The temporary occurrence of increased numbers of immature cells immediately following splenectomy is regarded as the result of release of the inhibitory effect of the spleen upon the delivery of cells from the marrow. It is believed therefore that the spleen through its reticular elements controls to a certain extent both the maturation of cells in the marrow and the emission of these cells therefrom.

The editor of the journal in a footnote points out that these conclusions do not necessarily follow Engelbreth-Holm's observations, that other mechanisms might be invoked to explain the return of the blood to normal after the removal of disease-containing tissue.

E. S. MILLS

Hygiene and Public Health

Prevalence, Incidence and Trend of Syphilis in Chicago. Usilton, L. S. *et al.*: *J. Am. M. Ass.*, 1938, 110: 864.

This was a study undertaken by the health authorities of the State of Illinois and the City of Chicago in cooperation with the Works Progress Administration to determine the number of patients with syphilis actually under observation and treatment by private physicians or in clinics in Chicago. All the clinics cooperated and 99.6 per cent of the private physicians. It is to be noted that the number of cases recorded are those under treatment and do not represent the total number of persons with syphilis.

The survey determined that 14,350 patients are constantly under treatment for syphilis in Chicago. This is a rate of 44 per 10,000 population. The negro rate is 237 per 10,000 and the white 28 per 10,000. Of those who seek treatment only 23 per cent of private patients and 52 per cent of clinic patients receive minimum effective therapy before they disappear from observation. Fifty-nine per cent of those who acquire syphilis do so before the age of 30 years. Of 11,400 clinic patients with late or latent syphilis 72 per cent had had no prior treatment. Of the patients with cardiovascular syphilis 82 per cent had had no prior treatment.

These and other facts revealed by the survey indicate the large number of individuals actually under treatment, and by inference the probably still larger number not under treatment.

FRANK G. PEDLEY

Obituaries

Dr. John Price Brown, of Toronto, who was 94 in March, and had been seriously ill at his home, died on April 3, 1938.

Dr. Brown graduated in medicine at the University of Toronto (1868), and was the first medical student of the university to be a double gold medallist. He had an outstanding reputation as nose and throat specialist.

For the past 20 years he was blind, but despite this handicap he turned his attention to writing and achieved note as the author of several Canadian historical novels. One of his works, Laura the Undaunted, in addition to its romantic interest, is a compendium of historical research, the doctor having exhausted the sources of information dealing with Laura Secord.

Dr. Brown came to Toronto from Manchester, England, at the age of 11. His father lived to within four months of being 100 years of age, and his mother died at the age of 95. The family settled on a farm at Walsingham, Norfolk county, and the son worked on the farm until he came to the university.

He began his medical career in Wellington county, and later spent 18 years in Galt, from whence he came back to Toronto. He took his L.R.C.P. in Edinburgh (1883). He was active in the founding of the Toronto Western Hospital, of which he was governor for many years.

Erichsen Brown, Toronto barrister, is a son.

Dr. Samuel Brown, of Mountain, Ont., died on March 4, 1938. He was fifty-eight years of age.

Dr. William Burnett, of Montreal, died on March 8, 1938. He was born at St. Hyacinthe, Que., January 4, 1871, was educated at Fettes College, a private institution, and matriculated to Bishop's College where he obtained his diploma in medicine at the age of 21.

Shortly after his graduation he was offered a position in Edinburgh, Scotland, but, as circumstances prevented him leaving the country, he took an internship at the old Western Hospital. After a year spent in post-graduate work he established himself in a private practice, and in 1896 was appointed to the staff of the obstetrical department of the Women's Hospital in which he served for 40 years, retiring as obstetrician-in-chief when it became the Women's General Hospital in 1936. He had been chief medical examiner in the Montreal district for the Metropolitan Life Insurance Company during the same period, and was awarded the company's long service medal.

Dr. Burnett joined the Canadian Army Medical Corps when the war broke out and was commissioned as a captain. Since the war he had been on the reserve list.

Dr. G. E. Butterwick died at Rochester, Minnesota, on March 21, 1938, following an attack of pneumonia. He was born near London, Ontario and was fifty years of age. He graduated from the Western University in 1910 and was silver medallist of his year. Following an internship in the General Hospital at Auburn City, New York, he came to Calgary in 1911 where he practised until shortly before his death. He leaves a wife and two sons.

Dr. James Lorne Graham, of Ottawa, died on March 12, 1938. He was born in 1888, the son of the late William Graham and his wife, Mary Jane Scott.

Dr. Graham received his primary education at Britannia and later attended Lisgar Collegiate Institute. After graduating from Lisgar he went to Toronto University where he received the degree of Doctor of Medicine (1909). He began practice in Ottawa immediately.

Dr. Richard Lionel King, of Prince Albert, Sask., was one of that city's oldest practitioners. He was born in Delaware, Ont. in 1878, the son of Dr. and Mrs. Richard King, of Peterborough, where he spent his early youth. He was educated at Upper Canada College and later graduated from Trinity Medical School, Toronto (1900).

Dr. King was an Anglican in religion, and in politics, following the traditions of his family, was always closely identified with the Liberal party. For some years he was president of the Liberal Association of Prince Albert.

For many years Dr. King served faithfully as a member of the Council of the College of Physicians and Surgeons of Saskatchewan and on the Executive of the Saskatchewan Medical Association.

At the time of his death, March 8th, he was coroner; in addition to his private practice he was medical officer for the Prince Albert penitentiary.

He was a man of broad sympathies and great kindliness of disposition endearing himself in his thirty years residence in Prince Albert to hosts of people.

He is survived by his widow and one brother, Dr. D. C. King, of Peterborough, Ontario.

Dr. Alfred John Leach, of Kenaston, Sask., died at the City Hospital, Saskatoon, on March 26th.

Dr. Leach was a graduate in medicine of the University of Toronto (1904). Coming west he practised for many years in the Togo district and later at Rush Lake, Lipton and Kenaston. He was a life-long member of the Anglican church and was a member of the Masonic Lodge at Togo.

He leaves his widow, Florence and daughter Elizabeth at home and a son, Tronson, of Saskatchewan University. Dr. Leach was a son of the late Alfred Leach, of Millbrook, Ont.

Dr. Alfred Thomas Little, of Barrie, Ont., died on March 29, 1938, in his seventy-sixth year. Born in the district where he practised for fifty-three years, he was the fourth son of William C. Little, M.P. for South Simcoe. After attending the Barrie High School, he went to Toronto and graduated from Trinity Medical School with honours (1885). He did some post-graduate work in New York, and then began practice in Churchill, where he remained until 1906. He spent the summer of that year in London, attending the hospitals, and on returning settled in Barrie, where he became Medical Officer of Health, in 1908, a position he held with great distinction till his retirement last year. Dr. Little was so much respected in the community that he had little difficulty in putting into force a pure-milk by-law, at a time when such an innovation was looked upon with distrust, even by some members of the profession. His keen interest in public health is also shown by the fact that Barrie was one of the first towns to have systematic toxoiding. He took more than a casual interest in medical inspection of school children and of the wards of the Children's Aid. He retained his associations with town, church and hospital affairs to the end.

In a busy life which called him to many a lonely farmstead in the early days, and in later years brought him in close contact with his colleagues for valued counsel, he found time to follow his healthy hobbies, horticulture, in which he was an expert and captured many prizes in the gladiolus shows,—poultry-raising and fruit.

It has fallen to few men to have the gift of friendship in such eminent degree as had Dr. Little. His kindness to young men and women starting out in life

was proverbial, and his gentlemanly thoughtfulness of his fellow-practitioners made him deeply loved, so that he leaves many behind him who hope that the conversations begun under the olives of Tibur may continue under the myrtles of the Elysian Fields.

Dr. William Lovett, formerly of Ayr, Ont., died on March 19, 1938, at the home of his daughter, Mrs. D. C. Petrie, at Detroit, aged ninety-six. He was the oldest physician in Ontario.

Dr. Lovett was born in Ancaster, near Dundas, in 1842. He was educated at the Ancaster Grammar School, and later attended the Normal School in Toronto. He graduated in medicine at McGill (1870).

He was one of McGill's first medical students and his medical diploma was the second one issued by the university. The late Sir William Osler graduated two years after he did.

Dr. Lovett was among the first to be examined and the first to be registered after the Provincial Board of Examiners was established in Ontario in 1870.

Dr. Lovett practised at Ayr from 1870 to 1907 when he retired owing to illness.

Dr. Duncan McEwen, of Maxville, Ont., died on March 23, 1938. Born on a farm north of Maxville, December 18, 1871, he was a son of the late Donald McEwen and his wife, Elizabeth Begg, both members of pioneer families. He received his primary education at the Maxville public school, later attending Cornwall high school. He entered McGill University and graduated in 1896 with the degree of M.D.

After graduation, Dr. McEwen opened a practice in Dunvegan, remaining there until coming to Maxville in 1910. His son, Dr. Bennett B. McEwen, who graduated in medicine in 1932, practised here with his father until the latter's retirement.

Dr. George Herbert Mathewson, of Montreal, died on March 18, 1938 in his 69th year. He was returning to his office in the Medical Arts Building, after performing an operation at the Central division of the Montreal General Hospital, when he suffered a heart seizure. He was taken at once to the Western division but died a few moments after his arrival.

Dr. Mathewson was a grandson of Samuel Mathewson, founder of one of Montreal's old wholesale grocery businesses of a century ago. He was a son of the late James Adams Mathewson, of Montreal, and Amelia Seabury Black, of Halifax, N.S.

He was educated at Montreal High School and McGill University, graduating B.A. (1890) and M.D., C.M. (1894). He then took a post-graduate course at Prague and Vienna and returned to Montreal to become clinical assistant, in 1895, to the late Dr. F. Buller at the Royal Victoria Hospital. He spent four years at the Royal Victoria and was then appointed to take charge of the Ophthalmological Department of the Western General Hospital. He retained that position until 1905, when he again went to Prague and Vienna to study. In the same year he came back to Montreal and became Ophthalmologist and Aurist-in-chief to the Montreal General Hospital.

After some years he decided to narrow his field of activity and confine himself to ophthalmology alone. He remained Ophthalmologist-in-chief to the hospital until 1931. He also held the post of professor of ophthalmology at Bishop's College for several years, later becoming associate professor at McGill University.

Dr. Mathewson married Cecilia Elizabeth Jeffrey, daughter of the late Andrew Jeffrey, of Toronto, in 1897. He is survived by his widow and one son, George Jeffrey Mathewson; three daughters, Mrs. J. D. McBoyle and Misses Mary Seabury Mathewson and Elizabeth Adams Mathewson, of Montreal; also three brothers, S. J. Mathewson, of Montreal, Edward P. Mathewson, of Tuscon, Ariz., and James Adams Mathewson, of Pasadena, Calif.

Dr. John C. Meahan, of Bathurst, N.B., died on March 11th, at the age of 79. Dr. Meahan was one of the oldest medical practitioners in New Brunswick, having graduated from McGill University fifty-two years ago. He was gold medallist at graduation. His early education was at St. Joseph's University. Dr. Meahan had been coroner for Gloucester County for many years.

Dr. George T. O'Donnell, of Woodstock, N.B., died on March 31, 1938, after only a few hours illness. He was a graduate of the Medico-Chirurgical College, Philadelphia (1904). Dr. O'Donnell had served overseas with the Canadian Army Medical Corps and had practised both in Maine and New Brunswick. He had always taken a considerable interest in parish and provincial politics and was a staunch Liberal. He was a member of the Knights of Columbus. At the time of his death Dr. O'Donnell was secretary of the Woodstock Medical Society.

Dr. Freeman Park Smith, of Mill Village, N.S., died on March 29, 1938, in his eighty-ninth year. Through forty-seven years past he had given of his skill and energies to the welfare of Mill Village and the surrounding country, coming there from Barrington Passage, where he had practised for some years after his graduation (Bowdoin) in 1881. He was an honorary member of the Nova Scotia Medical Society and a member of the Lunenburg-Queen's Medical Society. He is survived by his widow and one daughter, Mrs. James Buchanan.

News Items

Great Britain

Hunterian Society: Gold Medal for Practitioners.—Any registered general practitioner resident within the British Empire is eligible to compete, and the medal, which is of gold, is awarded annually to the writer of the best essay on a subject selected by the Society.

Competitors—men or women—must be engaged in general practice, and essays should be sent in by December 31st.

The essay must be unpublished and original, and be based on the candidate's own observation, but it may contain excerpts from the literature on the subject, provided that reference be made to the articles from which they are taken.

A copy of the rules and any further information can be obtained on application to the Honorary Secretary, Mr. Arthur E. Porritt, 27 Harley Street, W.1., London.

The subject selected for the essay is: 1938—"The Management of Inoperable Malignant Disease in General Practice". 1939—"The Treatment of Obesity in General Practice".

The 1937 Hunterian Gold Medal for General Practitioners was won by Dr. J. Wilson Reid, of Anglesey, for his essay on: "The Prognosis and Care of Heart Disease in General Practice".

Alberta

Dr. L. Rudin, of Calgary, has taken the mine contract at Nordegg, and commenced work there on April 1, 1938.

The town of Magrath, situated twenty-two miles from Lethbridge, is making plans to establish a Community Hospital, where the majority of patients can be treated at home.

A new Act has been passed in the Province of Alberta which makes certain changes in the interests of the injured workman and his family. In the case of the death of the father all children up to eighteen years of age will become beneficiaries. By the previous Act a panel of forty doctors, twenty from the southern part of the province and twenty from the northern part, sat in Boards of three to finally adjudicate on the injured man's disability. This board of review was to be final, but the new Act puts the responsibility on the Board, in case the injured workman is not satisfied with the decision. An attempt was made by chiropractors to have their cult recognized by having the names specifically mentioned. On the suggestion of the Minister of Health, a compromise was accepted, giving the Board power to use any therapeutic agent it desired. The chiropractors further asked that four of their members be appointed as referees for four-year periods, and their decisions as to what cases indicated chiropractic treatment should be final. This was not accepted by the Legislature. Another Act was passed placing the blind under benefits similar to old age pensioners, with the municipalities responsible for their share of the cost of the pension to their blind residents.

The Provincial Government decided not to submit a brief to the Rowell Royal Commission, and the medical profession felt that, in addition to sending a brief to the Canadian Medical Association, they should present one to the Rowell Commission, so that the members of the Commission might get Alberta suggestions in Alberta. The brief presented endorsed the Canadian Medical Association brief, and urged that further responsibility be assumed by the Federal Government in the matter of taking complete control of venereal diseases, tuberculosis, drug addiction and mental diseases. It was shown that, while the population of Alberta was over 60 per cent Canadian-born, fewer than 40 per cent of the patients in Alberta mental hospitals were Canadian-born. Over 60 per cent of our mental patients came from our immigrants, therefore a great responsibility rested on the Federal Government. The Alberta Brief further asked that, in view of the fact that the Federal Government paid a portion of the cost of relief to the unemployed, and this money assisted only in providing food, fuel, clothing and shelter, the scope of the Federal endeavour should be enlarged to include all unemployed, whether employable or not and include the provision of medical care.

The Brief stated that, if and when health insurance were adopted and put into effect, due consideration be given to the points agreed upon between the Government of Alberta and the medical profession, at the time when the Health Insurance Act was passed in this province. This Act was never put into effect owing to the defeat of the Government. The points were.

(*a*) All medical practitioners registered under the medical profession Act and in good standing were eligible to practise under the Act.

(*b*) The insured persons to have freedom of choice of the medical practitioner they wish to attend them, and vice versa.

(*c*) Specialists' services to be provided as a part of the scheme by reference from the general practitioner.

(*d*) In general, professional services to be paid for on the basis of specified fees for services rendered, and according to a suitable scale of fees to be approved by mutual agreement, somewhat on the Compensation.

(*e*) In certain outlying areas medical work to be paid for on a salary basis.

(*f*) Preventive medicine to be emphasized, and the area covered by the insurance scheme divided into districts properly staffed with public health officers and public health nurses, all to be paid out of the insurance fund.

(*g*) All necessary hospital services to be provided and paid for at the public ward rate. Extra necessary accommodation to be provided under the Act in certain cases. All prescribed medicines and necessary remedial appliances to be provided under the Act.

(*h*) Necessary dental services, whether of prophylactic emergency or curative nature, to be included, but replacements not included, at the present time.

(*i*) Necessary nursing services to be provided.

It is the opinion of the Council of the College of Physicians and Surgeons of Alberta that increased Dominion assistance in the financing of public health services is immediately imperative. No provision had been made for public health in the British North America Act, so that responsibilities of the Provincial and Federal Governments now stand in need of being clearly defined, according to the Brief submitted to the Rowell Commission at Edmonton. In general it urged the Dominion to assume a larger share of the load and seek more actively to elevate and unify the standard of public health in Canada. Dr. A. E. Archer, a member of the Council, stated that, "The question of the health of the people of Canada is of vital importance to all of the people of Canada. To have the responsibility refused by the Federal Government, accepted by the Provincial and by it passed on to the municipality, the body with the least taxing power and the least financial ability to assume it, means the maximum expectation is met with the minimum accomplishment. On humanitarian grounds the medical profession has borne the major load." Specifically, Dr. Archer suggested, enlargement of a separate Federal health department; a policy of Federal responsibility for providing the entire needs of the unemployed, employable or not. Under the last head were included, adequate relief, unemployment insurance, adequate medical care. As to health insurance, it should be Dominion-wide or on a provincial basis which could become part of a Dominion scheme. It should also be assisted by the Dominion and provincially administered on a standard approved by the Dominion.

G. E. LEARMONTH

British Columbia

The Mater Misericordiæ Hospital in Rossland had one of its busiest years in 1937, admitting almost 200 more patients for medical and surgical treatment than in 1936. The hospital now is running at full capacity.

A movement is under way in Trail to have the City Council pass a by-law compelling all food handlers to undergo a physical examination established for that purpose. A free clinic where food handlers could voluntarily undergo an examination and receive health cards was set up last spring by Dr. J. L. Gayton, city medical health officer. Few food handlers, however, availed themselves of this opportunity, and Dr. Gayton has urged the Council to pass a by-law compelling examinations.

At the forty-fifth annual meeting of the Nelson Hospital Society on March 10th the superintendent of the Kootenay Lake General Hospital stated that strenuous protest was planned against the provincial government's proposed reduction of hospital grants to hospitals. The president of the society announced that plans had been prepared for increasing the capacity of the hospital by extending the building.

The Greater Vancouver Health League and the Vancouver Medical Association held a three-day Health Week Exposition at the Hotel Vancouver during the week of April 10th.

D. E. H. CLEVELAND

Manitoba

Dr. A. V. Stoesser, Assistant Professor of Pædiatrics and Chief of the Staff of the Department of Allergy, University of Minnesota, addressed the Winnipeg Medical Society at a regular meeting on March 10th on the subject of "Allergy". He gave a concise account of the methods in use in the Department of Allergy in the University of Minnesota to determine the cause or causes in the patients who presented themselves or were referred to the clinic.

At a clinical luncheon at Grace Hospital Dr. D. L. Scott, Superintendent of the Central Tuberculosis Clinic, spoke on "Tuberculosis and pregnancy". He showed a number of chest films of tuberculous pregnant women before and after labour, and stated that if tuberculous pregnant women could have suitable treatment during pregnancy there was little need to terminate pregnancy. Dr. Bruce Chown, Pathologist to the Children's Hospital and Grace Hospital, discussed the interpretation and significance of tuberculin tests, sedimentation rate, and the simpler means of estimating the function of the kidneys in nephritis.

At a meeting of the Section of Obstetrics and Gynæcology, Winnipeg Medical Society, on March 16th, Dr. W. F. Abbott discussed the rôle of anæmia in mortality of gynæcological operations. He based his remarks on an analysis of 300 abdominal hysterectomies for uterine fibroid. The paper was discussed by Drs. J. D. Adamson, A. Hollenberg, C. R. Rice and others.

The clinical meeting of the Honorary Attending Staff of the Winnipeg General Hospital on March 16th was given up to a symposium on "Hyperthyroidism". The subject was introduced by Drs. H. D. Kitchen, J. M. McEachern, G. S. Fahrni and Prof. A. T. Cameron.

Dr. John M. MacEachern, of Winnipeg, was one of eight Canadian doctors who were recently elected Fellows of the American College of Physicians at the recent annual meeting.

Dr. P. H. T. Thorlakson has been appointed a member of the recently organized Medical Research Council of Canada for four years. ROSS MITCHELL

Nova Scotia

The admission of a small-pox case to Camp Hill Military Hospital, Halifax, in March caused a real scare throughout the city, with far-reaching effects. The patient, a sailor on a freighter docking at Halifax, slipped through the quarantine, was taken to the Immigration building, and from there to Camp Hill, which has been caring for sick mariners, in a taxi, where he spent several hours before the nature of his illness was ascertained and it was possible to move him. The disease was of particularly virulent form. The patient died, and, nine days later the two orderlies who had carried him from car to bed, although they had been immediately vaccinated, developed the disease. (The first vaccinations done showed no reactions.) The presence of one case was greeted indifferently by the public; the development of two more caused general alarm.

Halifax had been infamous among public health authorities because of the fact that, according to the number of exemption certificates presented in her schools, 60 per cent of the citizens were sworn conscientious objectors to vaccination. This was soon shown to be a fallacy. Tender consciences completely disappeared in the rush for vaccine. Anyone who had been near the immigration buildings, or who had a friend who had been there, anyone who had ridden in a taxi, anyone who had breathed the airy environs of Camp Hill, all sought vaccination. Supplies of vaccine were received daily, only to be exhausted in a few hours. Within ten days fully twenty-five thousand of the city's sixty thousand people had been vaccinated, many for the second time, because early supplies of vaccine received were almost fifty per cent impotent. The Dalhousie Public Health Clinic and private physicians devoted a great part of their time to vaccination. Rigid segregation and quarantine of all contacts was instituted, and, after another twelve days, when no new cases had developed, the tumult died and the stricken orderlies made a slow progress toward recovery. The results were these: (1) that the Dominion Government has appointed a commission to investigate the circumstances surrounding the case; (2) that quarantine regulations at the Port of Halifax will be revised; (3) that sick mariners are no longer to be admitted to the Military Hospital; (4) that the Halifax Medical Society is again to press adoption by the City Board of Health of recommendations made to it in a brief of several years ago; (5) that a committee of the Halifax Medical Society is to consult with the Dalhousie Health Centre as to cases to be admitted there for free treatment in the future; (6) that the city of Halifax probably has a greater number of vaccinated people per capita than any other on the continent.

If the far-eastern seaman could tear himself away from his Mohammedan paradise to visit the scene of his demise he might consider his death as having been worth while. Again, he might not.

The annual report of the Chief Health Officer, as tabled in the Nova Scotia Legislature, indicated that health conditions in Nova Scotia in 1937 were "entirely satisfactory". Total deaths were 5,987, of which 3,157 were male and 2,740 female, exclusive of still-births. "Communicable diseases with the exception of whooping-cough and diphtheria show either decreases or a tendency to follow the downward trend of recent years. There were no epidemics and most principal causes of death, with the exceptions of heart affections and cancer, show diminution. Particularly noticeable are the favourable morbidity and mortality records of typhoid fever, epidemic meningitis, enteritis and dysentery. For the sixth consecutive year not one case of small-pox occurred.

"Deaths from accidental causes were 27 fewer than in 1936. The infant mortality rate is the lowest ever recorded. This is significant for the reason that the number of infant deaths is accepted by health students as one of the most reliable indices available in determining whether or not public health is advancing or retrogressing."

Cancer showed a steady increase compatible with that of previous years, the death rates from 1932 on being as follows: 1932, 628; 1933, 638; 1934, 688; 1935, 617; 19.6, 687. Satisfaction is expressed at a lower mortality rate from tuberculosis, which now stands at 90 per 100,000. During the year 573 cases were treated at the Nova Scotia Sanatorium at Kentville, and 269 were treated in the four general hospitals with annexes. Whooping-cough claimed 98 lives, diphtheria 17, measles 6, scarlet fever 9, infantile paralysis 1, typhoid fever 4, venereal diseases 29.

Dr. Gerald Ross Burns (Dalhousie 1925), of the staff of the Victoria General Hospital, has been awarded a Fellowship by the American College of Physicians at their annual congress in New York.

Applications for admission to the first year of medicine for the 1938-39 session at Dalhousie from the Maritime provinces and Newfoundland are already well beyond the maximum number of fifty which the university will accept. Practically all the colleges of the three provinces and Newfoundland are represented in the applications.

Dr. Donald Mainland, Professor of Anatomy at Dalhousie, has accepted an invitation to join the committee to study organization of Medical Research in Canada.

Dr. A. Roy Chisholm (Dalhousie 1925) has taken up practice in Kentville.

That the provincial Department of Health undertake a more aggressive campaign to instruct the people in the great dangers of destructive social diseases was the substance of a petition submitted by the Northside Ministerial Association.

The problem of feeble-mindedness came up in the annual report of the Children's Aid Society. Sterilization or segregation of the unfit was recommended by F. R. MacKinnon, Secretary-agent of the Society. Rev. J. W. Brent felt that an act prohibiting the marriage of the feeble-minded was necessary. Dr. M. R. Elliot, speaking in Wolfville on the same subject, warned social workers against hasty decisions; that sterilization is not the complete solution of the problems.

Dr. T. A. Kirkpatrick, of Kentville, has gone to New York where he will do post-graduate work in gynæcology.

The annual meeting of the Federation of Societies of Experimental Biology at Baltimore was attended by Drs. N. B. Dreyer, E. G. Young, C. B. Weld and D. H. Heard, of the Dalhousie Medical School. A. L. MURPHY

New Brunswick

At the annual meeting of the Council of Physicians and Surgeons of New Brunswick, held in Saint John recently, a large amount of routine business was transacted. A new regulation was put through by which the local Provincial examinations for registration have been abolished and the Medical Council of Canada has been made the sole portal of entry to registration under the Council of Physicians and Surgeons. Officers for the year were elected as follows: *President*, Dr. W. E. Gray, Milltown. *Registrar-Treasurer*, Dr. J. M. Barry, Saint John.

Dr. E. C. Menzies, Superintendent of the Provincial Hospital of Fairville, was the speaker at the monthly meeting of the Saint John Medical Society. Dr. Menzies classified and discussed the commoner forms of mental derangement, and in answer to questions after his address helped to clarify various difficulties and misconceptions in the diagnosis and prognosis of mental diseases. Dr. Menzies stated that the committal of an insane person to an asylum was a legal rather than a medical problem.

The annual report of the Chief Medical Officer of Health, which was tabled in the legislature by the Acting Minister of Health, contained as usual a number of matters of interest. It was stated that in the past eight years 113,000 school children throughout the province had been immunized against diphtheria. The typhoid record for 1937 was not so good as usual, 161 cases being reported and 27 deaths. Also 155 cases of poliomyelitis were reported between July and October, 102 of these being in the city of Saint John. Only four deaths were reported from this disease.

Two cases of leprosy were discovered in the province during the past year and were admitted to the Dominion Hospital at Tracadie.

The death rate from tuberculosis was reported to have risen from 82.1 to 84 per 100,000 in the calendar year of 1936, the last year for which figures are available. A. STANLEY KIRKLAND

Ontario

Dr. George W. Craig has been appointed superintendent of St. Lawrence Tuberculosis Sanatorium, succeeding Dr. A. D. Lapp who has resigned.

A fine new hospital building has recently been opened by Dr. M. E. Stalker, Inspector of Hospitals for Ontario, at South Porcupine.

Dr. Charles H. Best, Professor of Physiology at the University of Toronto, has been elected a Fellow of the Royal Society of England.

On March 30th, Dr. Lydia Giverson, of New York, lectured in the convention hall of the Chateau Laurier, Ottawa, under the auspices of the Division of Industrial Hygiene of the Department of Pensions and National Health. The subject was "Mental hygiene in industry". Dr. Giverson, a graduate of McGill University, Montreal, has devoted her time to the field of psychiatry.

It is announced that the extensive addition being made to the Hotel-Dieu, Windsor, will be ready for opening about May 1st. The cost of this project was something over one-quarter of a million dollars. It provides an extra 100 beds, raising the bed accommodation in the institution to 215. Five operating rooms are now provided, three for major and two for minor operations, also cystoscopic and fracture rooms, and x-ray rooms, and laboratories.

Dr. Haven Emerson, Professor of Public Health Administration at Columbia University, New York, lectured for the Health League of Canada on March 4th on "How better health will make life longer, deeper and broader". The final lecture of this year's series was given on April 4th by Dr. Ernest A. Branch, in charge of the Dental Division of State Health Department of North Carolina, on "One means of preventing disease and lengthening life".

The Listowel Memorial Hospital five years ago undertook the introduction of hospital-care contracts. For a very moderate sum any family or individual may purchase a contract which in the event of sickness entitles the individual to free hospitalization for a stipulated period. Five years' experience reveals that only from 15 to 20 per cent of the contract holders have found hospitalization necessary. The report of the fifth year of operation indicates results which are satisfactory both to the hospital and to the contract holders.

The Toronto General Hospital has now in operation its powerful new x-ray unit, built on a grant of $35,000 from the provincial government. It provides for simultaneous treatment of four patients from each of the 400,000 volt x-ray tubes.

The President of the University of Western Ontario announces that Dr. Henry A. Christian, Professor of Medicine at Harvard Medical School and Physician-in-Chief at the Peter Brent Brigham Hospital, will be the convention speaker on June 1st.

Dr. Madge Thurlow Macklin, Assistant Professor of Histology and Embryology in the University of Western Ontario Medical School, delivered a lecture on "Heredity in cancer" before a combined meeting of the New York Gastroenterological Association and the Section of Pathology at the New York Academy of Medicine on March 29th.

The decision of the Provincial Government to take over the entire cost of tuberculous indigent patients in the province will mean an annual saving of $50,000 to the County of York. During the year 1937 approximately $50,000 were spent by the county for hospitaliza-

tion of indigent tuberculous patients, and indications point to an increase in this amount in the future.

J. H. ELLIOTT

Saskatchewan

An Act respecting Mutual Medical and Hospital Benefit Associations has been passed by the Saskatchewan legislature. The chairman of the health services board shall be registrar of mutual medical and hospital benefit associations. Any ten or more persons may present a petition to the registrar. Upon the issue of a certificate of incorporation by the registrar the petitioners shall be a body-corporate.

An Association may make agreements, not inconsistent with its objects, with one or more duly qualified medical practitioners, dentists and nurses, and with one or more of the institutions, whereby it is undertaken that for a specified consideration to be paid by the Association specified services will be rendered to the members of the Association and to such of their dependents as may be provided for by the agreement. The Association must send to the registrar a statement of the condition of affairs of the Association as at the end of the fiscal year.

Dr. Lillian A. Chase gave a paper on "Diabetes" at the Prince Albert and District Medical Society on March 14th. A moving picture on "Tests for fertility and sterility" was shown. It was decided that the Prince Albert Medical Society, who are hosts to the Saskatchewan Medical Association, would hold the convention at Waskiesu on August 3rd, 4th and 5th. The College of Physicians and Surgeons will arrange the scientific program; the local society will provide entertainment, with emphasis on golf and boating.

News has been received from London, England, that Dr. A. L. Woodhead has been made a member of the College of Obstetrics and Gynæcology. Dr. Woodhead was a graduate in Science from the University of Saskatchewan and was one of the first women medical students of that university. She completed her medical course in the University of Manitoba. After practising for a time in Saskatchewan she went to England for post-graduate studies. She is at present in London.

Dr. J. M. Uhrich said in answer to a question in the Legislature that at present 75 municipal doctors are now practising in the province. A year ago there were 72.

Dr. J. C. Paterson was presented with a silver cigarette case at a dinner held in his honour by the medical staff of the Regina General Hospital. He has been appointed pathologist to the Ottawa Civic Hospital.

Dr. Donald Moore, a graduate of the University of Toronto in 1934 has come to Regina from Vancouver to be pathologist at the Regina General Hospital.

Dr. R. C. Riley has been appointed pathologist to the Holy Cross Hospital, Calgary.

LILLIAN A. CHASE

United States

The Chicago Tumour Institute, chartered in Illinois, not for profit, to conduct research on the causes, diagnosis and treatment of cancer, to instruct and assist physicians, surgeons, clinics and hospitals in the diagnosis and treatment of cancer, and to train cancer specialists, opened on March 21, 1938.

The two unique features of the Institute are, (1) the assembling of a group of leading cancer authorities from various medical centres of the world to collaborate in the study of the cancer problem; and (2) the formation of an organization devoted exclusively to the study of cancer. One of the important functions of the Institute is to train physicians and surgeons desiring to specialize in the diagnosis and treatment of cancer.

The Institute is equipped with research laboratories and modern x-ray and radium equipment. The former includes two x-ray machines of medium voltage and two of the super-voltage type. The Institute will have at its disposal eleven grams of radium, ten of which will be used in the form of a radium bomb. The Scientific Committee is composed of Sir G. Lenthal Cheatle, F.R.C.S., Drs. Max Cutler, Henri Coutard, A. H. Compton and Ludvig Hektoen.

Dr. Henri Coutard has been on a five-month leave of absence in the California Institute of Technology, where he has engaged in research with the million-volt x-ray apparatus in the laboratory of Professor Robert A. Millikan of Pasadena. Sir Lenthal Cheatle, who is now in Chicago, will devote his time to laboratory research and post-graduate instruction. Dr. Max Cutler was formerly a Rockefeller Fellow in the Memorial Hospital, New York, and recently the Visiting Professor of Surgery in the Rockefeller Medical School in Peking, China. He is now Consultant in Cancer in the Hines Veterans Hospital, and Associate in Surgery in the Northwestern University Medical School.

Indigent patients amenable to radium treatment will be accepted free of charge.

Hospital Day at the New England Sanitarium and Hospital.—On May 12th, the Sanitarium is again attempting to present such an educational program that the thousands of visitors who come here on that date will go away feeling that they have a fairly adequate idea of what the modern hospital can do for them in case of sickness, and also with a somewhat intelligent conception of how to maintain their health. The special program will be from 2.00 to 4.00 p.m. and includes band music, a prominent speaker, a morning chapel program and flag-raising, tour of the institution with educational displays, a baby party and clinic, educational exhibits in the gymnasium, a dietetic booth, and tree planting in memory of Mathew O. Foley, founder of National Hospital Day.

If all hospitals put forth a concerted effort on Hospital Day to enlighten the public as to what the modern hospital is able to do, it would be an important factor in overcoming any prejudice or misunderstanding that may be existing in any community. Paul R. Cone, Chairman, Local Hospital Day Committee.

General

The International Association of Thalassotherapy which includes representative persons of twenty-four nations has chosen Montpellier-Palavas on the Mediterranean shore to hold its Eighth Congress, from June 3 to 6, 1938.

The questions to be discussed are: (1) tuberculous peritonitis; (2) the meteorological factors of the sea climate. Each national committee nominates two speakers. The French speakers for the first question are Drs. Félix Berard and Pierre Imbert d'Hyères and, for the second, Professors Pech and Puech of Montpellier. The members of the congress will be able to present communications referring to the proposed questions. Each author will be allowed to deliver his address in his national language, but the texts handed to the Secrétariat for insertion in the Transactions must be written in one of the five following languages: English, French, Italian, German and Spanish.

In the course of the Congress the hospitals at Montpellier and many sea-cure establishments in the neighbouring country will be visited.

For the inscriptions, communications and general information apply to the Organization Committee of the Eighth Congress of the International Association of Thalassotherapy, 8, rue André Michel, Montpellier, France.

Book Reviews

A Textbook of Hematology. William Magner, M.D., D.P.H. 395 pp., illust., $4.50. P. Blakiston's Son & Co., Phila., 1938.

The purpose of the book, as set forth in the author's preface, is to present the subject of hæmatology in a manner acceptable to practising physicians as well as those primarily interested in the study of disease by laboratory methods. In this the author has succeeded. The book is well illustrated with 20 plates in black and white and 3 coloured illustrations showing the bone marrow and the various blood cells. The first six chapters deal with the origin and development of the various normal and abnormal cellular elements of the blood. The seventh chapter deals with laboratory methods. The remaining ten chapters are devoted to a discussion of the pathology, diagnosis, and treatment of diseases of the blood. The book is heartily recommended as a textbook on the subject of hæmatology.

British Encyclopædia of Medical Practice. Edited by Sir Humphry Rolleston. Vol. 6, 602 pp., illust., $10.00 a vol. Butterworth, Toronto, 1937.

This volume deals with subjects ranging from gonorrhœa to hydrotherapy. The standard of writing is well maintained, and the compression of material to small compass is particularly notable in such subjects as gout and Hodgkin's disease. In the discussion of hæmoptysis one finds rather less emphasis laid on bronchiectasis as a frequent cause than some might expect. The chapter on heat-stroke and heat-exhaustion is unusually full of interest. The subject of hydrotherapy is given more space than one is accustomed to look for on this side of the Atlantic, but that possibly is because we here do not pay enough attention to the spa treatment.

Pulmonary Tuberculosis in Practice. R. C. Wingfield, B.A., M.B., B.Ch., F.R.C.P. 122 pp., illust., $2.75. Macmillan, Toronto, 1937.

The writer of this book makes a good deal of the fact that the general practitioner does not know as much about tuberculosis as he should. This is because the diagnosis and treatment of the disease are largely in the hands of the state and the specialist, and as soon as tuberculosis is discovered it is passed on to these. His book is an attempt to bridge this undesirable gap between the practitioner and the specialist. There are certain fundamental aspects of tuberculosis which can easily be grasped, especially if they are presented clearly, as is done in this book. The pathogenesis of chronic pulmonary disease is first dealt with, followed by a chapter on the clinical aspects, and a final section on some special aspects of the treatment of tuberculosis in general practice. A great deal of experience and sound advice is put into a small space and the book is well worth reading.

Fractures and Dislocations for Practitioners. E. O. Geckeler, M.D. 252 pp., illust., $4.00. University of Toronto Press, 1937.

The purpose of this book, as the author states in his preface, is "to condense the subject of fractures and dislocations without the omission of important details", for the use of the general practitioner and for emergency fracture work. He has achieved his object in a clear manner.

The book is divided into two parts. The first deals with fractures. The first six chapters deal with immediate treatment, immobilization, which includes the proper application of splints and plaster, traction both by adhesive and the different newer methods of skeletal traction. There is also a good chapter on follow-up treatment. While he mentions unpadded plaster, the author feels that for the general practitioner the padded type of plaster splint is much safer. The different fractures are described and the appropriate treatment given in a concise manner.

The second part deals with dislocations. Here again the author is clear and definite in his instruction, avoiding all controversial methods. The book also deals with early treatment, and is particularly keen on follow-up treatment with massage, diathermy, etc. A whole chapter is devoted to this subject. For anyone looking for a short, concise, yet adequate, book on common dislocations and fractures, this work can be recommended. It is particularly useful for the general practitioner who, today, with the increasing number of automobile accidents is sure of seeing many more fractures than formerly.

Appendicitis. W. H. Bowen. 201 pp., $2.25. Macmillan Co., Toronto, 1937.

This book is well written and indicates that the author has had a very comprehensive experience in appendicitis. The classification of the pathological types is a suitable one. The chapters on symptomatology and differential diagnosis are excellent and well worth the reading on the part of any practitioner of medicine. The pitfalls in diagnosis are well described and reliably detailed. In the realm of treatment however, one feels some of the post-operative treatment could be improved upon. Commenting upon the complications, it would appear that much emphasis has been placed upon the paralytic ileus and not enough upon post-operative mechanical obstruction. More time might have well been spent here with profit. The rôle of early diagnosis and jejunostomy in this type of case might well have been considered in detail. Further, the use of continuous gastric lavage or suction with the continuous intravenous saline therapy might have been mentioned as valuable modern adjuncts to the treatment of complications such as peritonitis and ileus in this disease.

The book is well worth having and should occupy a place on the library shelf of students, physicians and surgeons.

Dextrose Therapy in Everyday Practice. E. Martin, Sc.D. 451 pp., illust., $3.00. P. B. Hoeber, New York, 1937.

This book is written by a Doctor of Science and incidentally shows how much the science of medicine is indebted to the unselfish work not only of the pure chemist but the biochemist, physicist and physiologist as well. Stress is laid on the fact that dextrose is the most intimate and essential sugar of vegetable and animal life, the building unit of carbohydrate metabolism. The importance of this has possibly been somewhat neglected or not fully realized. If such has been the case in the past the author has succeeded in giving dextrose the place it deserves. It is doubtful if any substance used in medicine has ever had a more thorough study made of it in any one volume.

The bibliography is most extensive; about 2,000 articles in the literature of the last number of years are referred to and their subject matter analyzed. The chemical nature and physiological action of dextrose are given separate chapters, and this is followed up by chapters on its uses in alimentary disturbances, metabolic disorders, deficiency diseases, infections, cardiovascular, renal and nervous diseases, disorders of pregnancy and in surgery. The last chapter deals with modes of administration and preparation of solutions. Probably the book will lack appeal to the general practitioner but for the internist or consultant it is full of useful material, and to all interested in the fundamentals of medicine it is strongly recommended.

Artificial Fever Produced by Physical Means. C. A. Neymann, A.B., M.D., F.R.S.M. 294 pp., $6.00. C. C. Thomas, Springfield, 1937.

Dr. Neymann has produced an exhaustive review of hyperpyrexia in the treatment of disease. He dwells on the fact that this method has only a limited

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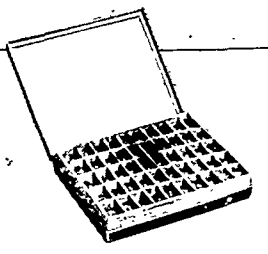
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part in therapeutics but there is certainly great value to be derived from its carefully appraised application. He points out that it is the afrebrile diseases or those with a minimum amount of low grade fever, which may be expected to benefit most from electropyrexia.

The history of the development of the method is of great interest. It is followed by detailed chapters on the physiology of hyperpyrexia and then the technique of electropyrexia. The rest of the book describes its use in such diseases as syphilis, arthritis, gonorrhœa, and asthma, with a chapter on "other diseases".

The book is of considerable value in connection with the study and use of artificial fever in disease.

Introduction to Ophthalmology. P. C. Kronfeld, M.D. 331 pp., illust., $3.50. C. C. Thomas, Springfield, 1938.

This book is worthy of more than ordinary attention because of its plan. It was not designed to be exhaustive and, therefore, is of convenient size. At the same time the subjects dealt with are covered adequately. In the Introduction the author states that he has endeavoured to formulate the principles underlying that portion of ophthalmology which is a necessary part of basic medical education. His presentation of the subject is intended to supplement the short and chiefly practical courses on ophthalmology with which the teachers of that subject have had to be content in many colleges on account of the crowded state of the curriculum. There is much more in the book, however, than the medical student is likely to master at the time. Nevertheless, it will be invaluable to him later, and, indeed, contains much that would be of assistance to the mature specialist. Each subject is introduced with a brief consideration of anatomical and physiological principles, and the various diseases are dealt with in the light of their etiology and pathogenesis. The approach to the subject is in all cases scientific. Also, the historical aspects are not neglected. Treatment, operative and otherwise, is not dealt with in great detail but depends logically on the principles previously laid down. The plan of the book, as carried out, seems eminently reasonable, and the book is very readable. A feature is that some excellent pictures of the fundus are collected at the end and the index is combined with an ophthalmological dictionary. This book on the eye is unlike any that we have met with so far, but, in our judgment, abundantly justifies its publication. It is to be highly commended.

Manual of Psychiatry and Mental Hygiene. A. J. Rosanoff, M.D. 7th ed., 1091 pp., illust., $7.50. John Wiley & Sons, New York, 1938.

In this manual of Psychiatry and Mental Hygiene, Dr. Rosanoff has brought up to date the more recent investigations in this rather rapidly developing field. Ample and timely consideration is given to such organic factors as cerebral birth injuries, the infectious encephalitides, avitaminoses and other nutritional disturbances as related to certain common neuropsychiatric conditions, and the psychogenic factors in the development of mental disorders are clearly indicated. The book is divided into five parts; the first of which is devoted to the general problems of psychiatry and deals with etiological factors, symptomatology, special neuropsychiatric syndromes, as well as the general pathology of mental disorders. In section two an attempt is made to classify the various types of mental disorders including the mixed, transitional, borderline, and miscellaneous mental disturbances which are so frequently difficult to delineate. In part three the author discusses methods of psychiatric investigation, therapeutic techniques, and medico-legal questions. In a special section devoted to mental hygiene, the biological, social and economic factors as related to the preventive aspects of psychiatry are given due emphasis. Here the author summarizes the current attitude to mental hygiene problems of childhood and adolescence. The final section of this book consists of an outline of diagnostic procedures, a detailed account of spinal fluid examination methods, and a description of the Stanford Binet Scale for intelligence testing. The arrangement of the material in this book, the use of numerous illustrative case histories, and the manner in which the author has succeeded in presenting the problems in the field of psychiatry as an expression of the psycho-biological reaction of the individual to his environment, make it a valuable textbook for teaching purposes as well as an excellent reference book for the internist and the neuro-psychiatrist.

A Textbook of Ophthalmology. S. R. Gifford, M.A., M.D., F.A.C.S. 492 pp., illust., $4.50. McAinsh, Toronto, Ont.

This compact and handy work is designed for the use of students and general practitioners. It does not pretend to be exhaustive, but does deal with the ordinary conditions of the eye which it is essential for the medical man to know about, and it deals with them in a logical and sufficiently lucid way. The book begins with chapters dealing with the examination of the eyes and the instruments involved. It passes on to the functional examination of the eyes, notably, disorders of refraction and ocular motility, and then deals with the various diseases of the eye as they affect the different parts, including their treatment. Useful chapters are appended on the different therapeutic agents employed in ophthalmology and the behaviour of the eyes in relation to many general diseases. There is an appendix which instructs us how to estimate the amount of disability which arises in connection with diseases of the eye for purposes of compensation. Altogether, the work is adequate and well adapted to the author's purpose. It can be commended, within its limits.

Genital Abnormalities, Hermaphroditism and Related Adrenal Diseases. H. H. Young. 649 pp., illust., $10.00. Williams & Wilkins, Baltimore, 1937.

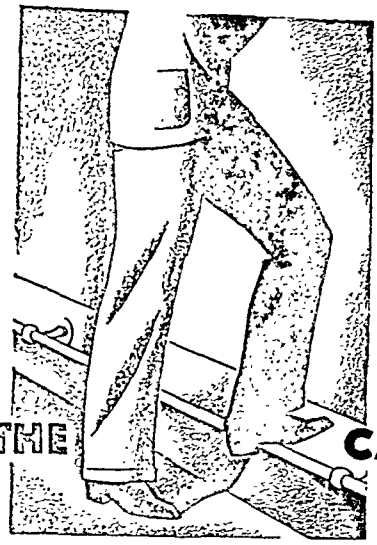
We have in this publication a most interesting presentation of an intriguing subject. From earliest times the possessors of genital anomalies have been the object of widespread attention, which is well brought out by the author's chapter on the hermaphrodite and the pseudo-hermaphrodite in literature and art. The value of this chapter, like those of the whole book, is increased by the excellent and well chosen illustrations.

The cases of true hermaphroditism (three in number) and those of the more frequently found pseudo-hermaphroditism are reviewed, the author's large experience with this class of case adding greatly to their value. Much may be done for the unfortunate victim of these anomalies, though in some cases, notably illustrated here, the anomaly has been made the source of profit. Dr. Young describes many cases where operation was successfully performed, the remedial operations which have been applied being described with full details of the technique used.

The book is well printed and well illustrated. Most of the illustrations are by the well known medical artist, Wm. P. Didusch. They are by no means the least important feature of the work, and lend much value and interest to it.

Sex in Relation to Society. H. Ellis. 529 pp., $3.75. Macmillan, Toronto, 1937.

The author states in the preface to this book that this volume is an abridged and revised edition of the 6th and concluding volume of his original "Studies in the Psychology of Sex", and that the present edition is intended for a wider public. The content of this earlier work has been revised to include the various manifestations of sexual life particularly as related to the social demands of our present day civilization. The biological and psychological aspects of this problem are presented in detail



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and throughout the book frequent attempts are made to summarize medical opinion as related to this subject matter. The book is written in typical Ellis fashion and is replete with historical references and summaries of more recent scientific investigations in this field. The suggestions made with reference to the advice which the physician should give to his patient on such problems as sex education and the commoner marital difficulties appear to be thoroughly sound and should be very helpful to the general internist, who is fresuently consulted regarding such problems and is often at a loss to know what to advise.

Mental Therapy. Studies in Fifty Cases. L. S. London, M.D. Two vols., 774 pp., $12.50. Covici Friede, New York, 1937.

These books consist of a compilation of psychiatric case histories which have been studied by the author over a period of years.

To indicate his therapeutic approach he discusses briefly in section one the evolution of psychotherapeutics and emphasizes certain aspects of psychoanalysis. In many of the cases the author suggests that the psychoanalytic approach is the only possible therapeutic one and briefly illustrates this method in the case presentations.

Sir Kenelm Digby, Writer, Bibliophile and Protagonist of William Harvey. J. F. Fulton, M.D. 75 pp., illust. Peter and Katharine Oliver, New York, 1937.

This charming book is the substance of a paper read before the Grolier Club of New York on April 15, 1937, and brings together all that is at the moment known about a versatile and, indeed, unique personality. A gossip, a gadabout, interested in everything, a strange mixture of credulity and skepticism, Digby appears to have been, in a sense, the "Admirable Crichton" of his time. Contemporary opinion was not always complimentary of him. Evelyn, who knew him well, called him "an errant mountebank"; Stubbes called him "the very Pliny of our age for lying". Lady Fanshawe refers to his "infirmity" of lying about his scientific experiments, though "otherwise he was a person of excellent parts and a very fine-bred gentleman". Yet, Digby was entitled to greater approbation than this. Unfortunately, his very versatility brought upon him the opprobrium of superficiality. Dr. Fulton, however, has in this book done much to rehabilitate his character and place him in his proper perspective. In fact, Digby was a man of no mean parts. He was an analytical thinker; he was a friendly critic of Descartes; he was the protagonist of William Harvey, whose discovery of the circulation of the blood was first discussed in English by Digby; he was quick to note and comment on Browne's "Religio Medici". We are glad to learn from Dr. Fulton that there are still phases of Digby's life and work that are in need of elucidation. His political career is somewhat of an enigma, and his place as a writer of English prose deserves further study. We hope that some day, Dr. Fulton will feel constrained to round out the work he has so well entered upon. Then we shall know the full truth.

This book is a beautiful exemplar of the bookmaker's art and a delight to the mind and eye.

The Physician's Business. G. D. Wolf, M.D. 384 pp., illust., $6.00. Lippincott, Montreal, 1938.

This book will be found helpful to the young medical undergraduate and intern who contemplates entering practice. Arguments are given for and against each type of medical practice. The author suggests 3 years of general practice before specializing. The location, equipment, and personnel of the office are given fully. The young man who lacks funds to obtain all of these may readily choose the essentials from these lists. And, there is need in the early years of practice for the hope of being able some day to get this new instrument or that new location rather than to have an office fully equipped awaiting the patient who probably does not come. This book and others written in the same vein are good "light" reading for the professional neophyte.

Foods America Gave the World. A. H. Verrill. 289 pp., $3.00. L. G. Page, Boston, 1938.

How interesting a thing is food! Its sources, its variety, its history—all make up an absorbing picture, and the author of the book has made the most of his splendid subject. He concerns himself only with native American food plants, but that is a large "only". Not the least interesting point brought out is that our modern methods of curing and treating such food stuffs as cocoa, or vanilla, or of preparing various dishes from such a food as maize, were all thoroughly understood by the ancient American Indians. One admires also the little clearcut drawings of vessels and cooking implements in the shapes of various fruits and vegetables, such as the pineapple, corn, chocolate, beans, etc., all dating thousands of years back.

A good point is made of the fact that many tropical and subtropical fruits and vegetables are really of great value as being extremely good to eat, and yet are not brought to more northerly countries as much as they should be. Some of course are too delicate and can only be enjoyed in the tropics, but there are still a good many which should be more popular. The avocado pear for example is delicious and nutritious, but its introduction into Canada and the Northern States is slow. Incidentally, the author is a little hard on the *genip* which does not receive the praise it should as a delicious fruit. The book is well written and is full of an extraordinary amount of material, all well presented.

The Practitioner's Library of Medicine and Surgery. Vol. 12, Supplement and Index. 1061 pp., illust., $120 (sold only as a set). Appleton-Century, New York, 1938.

This volume brings the subject matter of the 11 preceding volumes, reviewed in this *Journal* since 1935, to date. There are 66 contributors, some of whom are Canadians. The previous volumes are Anatomy and Physiology, Technique of Clinical Medicine, Practice of Medicine, Non-traumatic Surgery, Traumatic Surgery, Obstetrics and Gynæcology, Pædiatrics, Therapeutics, Neurology and Psychiatry, Dermatology and Syphilology, Eye, Ear, Nose and Throat, under these titles. The work is monumental in its extent. Most of the subjects have been condensed to that which is proved and useful in practice, although the experimental is referred to frequently. The supervising editor, George Blumer, has carefully refrained from inserting the hypothetical conclusions of many new measures of treatment, and has accentuated the physiology and pathology. He has shown that he believes any well-trained reasoning physician can utilize in his daily work the proved physiology and organic chemistry which have been brought to light in the past few years; this is particularly true in the discussion of Blood and of Psychiatry. One is impressed with the common sense attitude towards diseases of the upper respiratory tract which do embrace about 35 per cent of the practice of the general practitioner. The new measures advised in the treatment of syphilis will save a practitioner more than the price of the entire set; he will get results as favourable as any of the larger clinics.

The present volume is subdivided into 15 sections and deals with the following subjects: anatomy and physiology; medical technique; infectious diseases (recent progress in influenza); diseases due to physical agents such as lightning and radium; intoxications from drugs and bacteria and fungi; disorders of metabolism such as spontaneous hypoglycæmia and calcinosis; diseases of the gastro-intestinal tract such as prevention and regional ileitis; diseases of the lung

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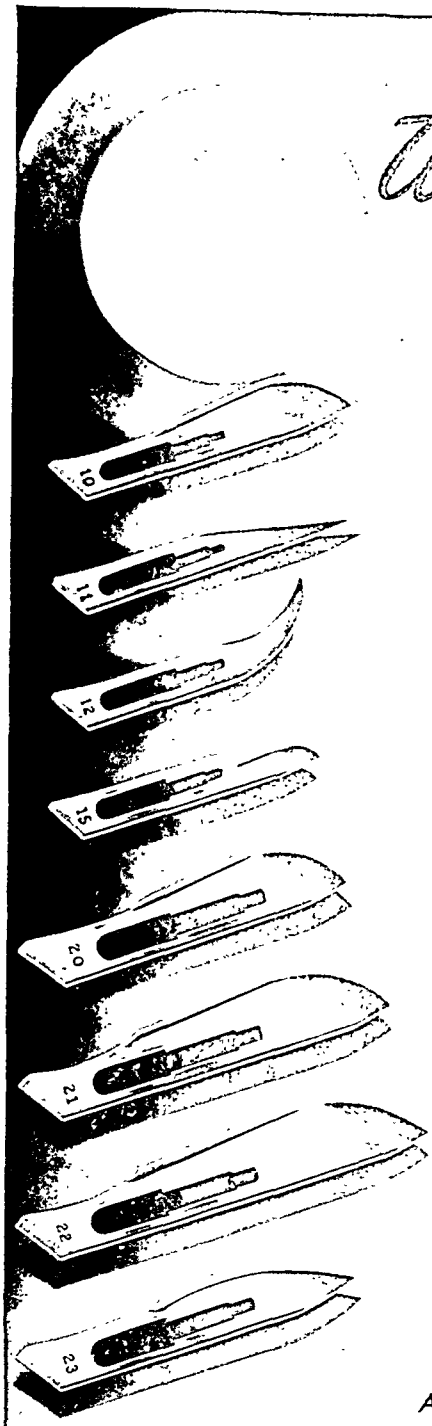
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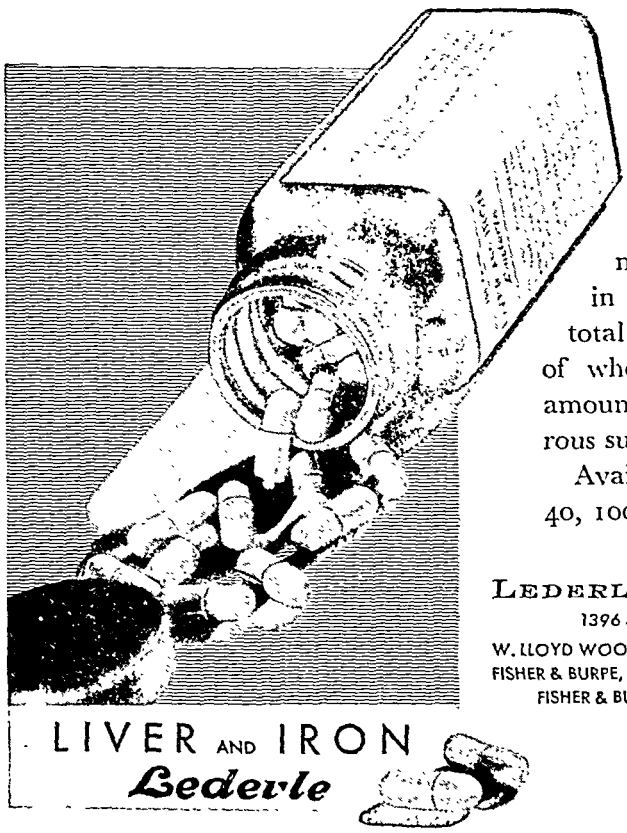
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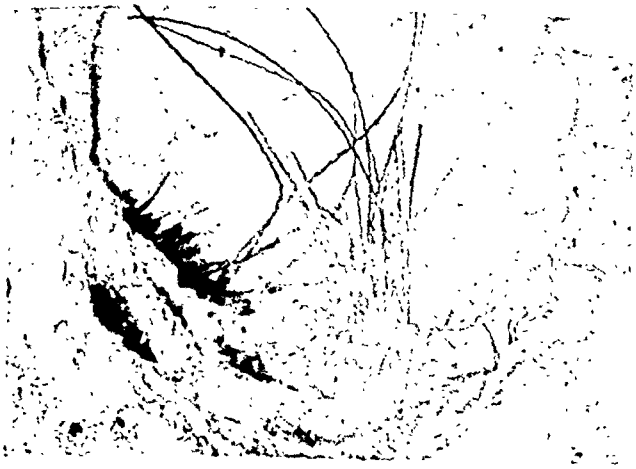
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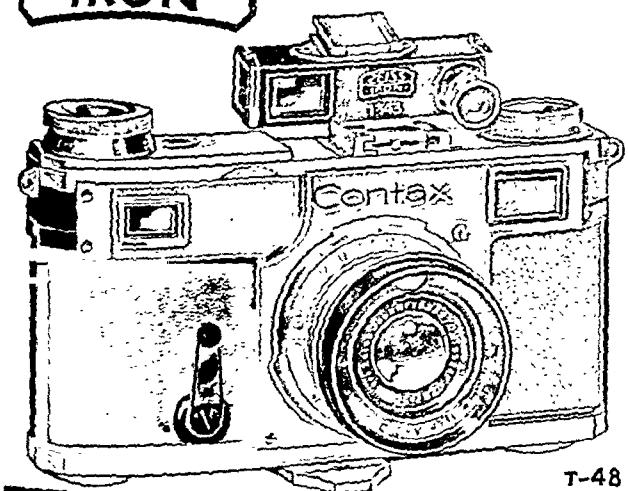
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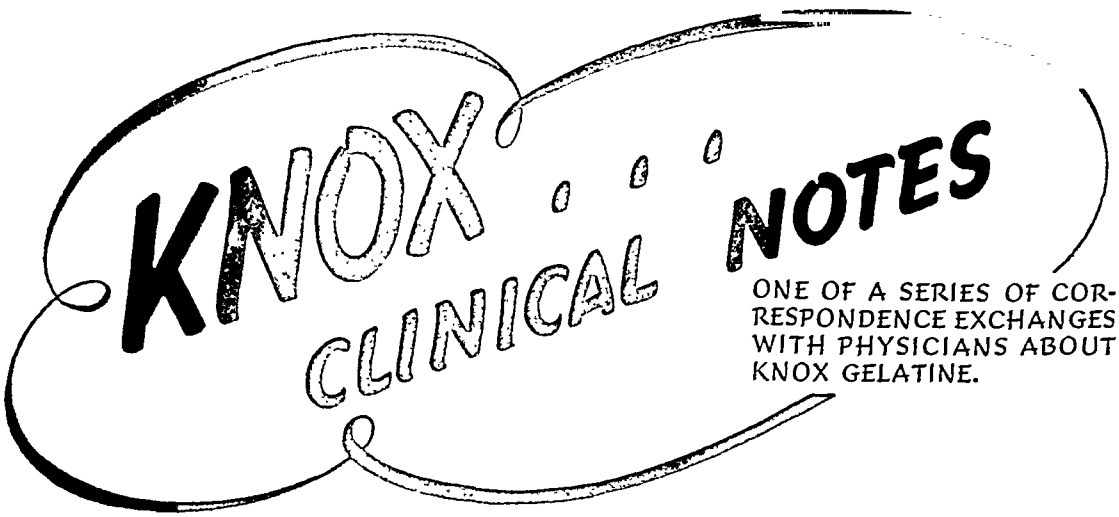
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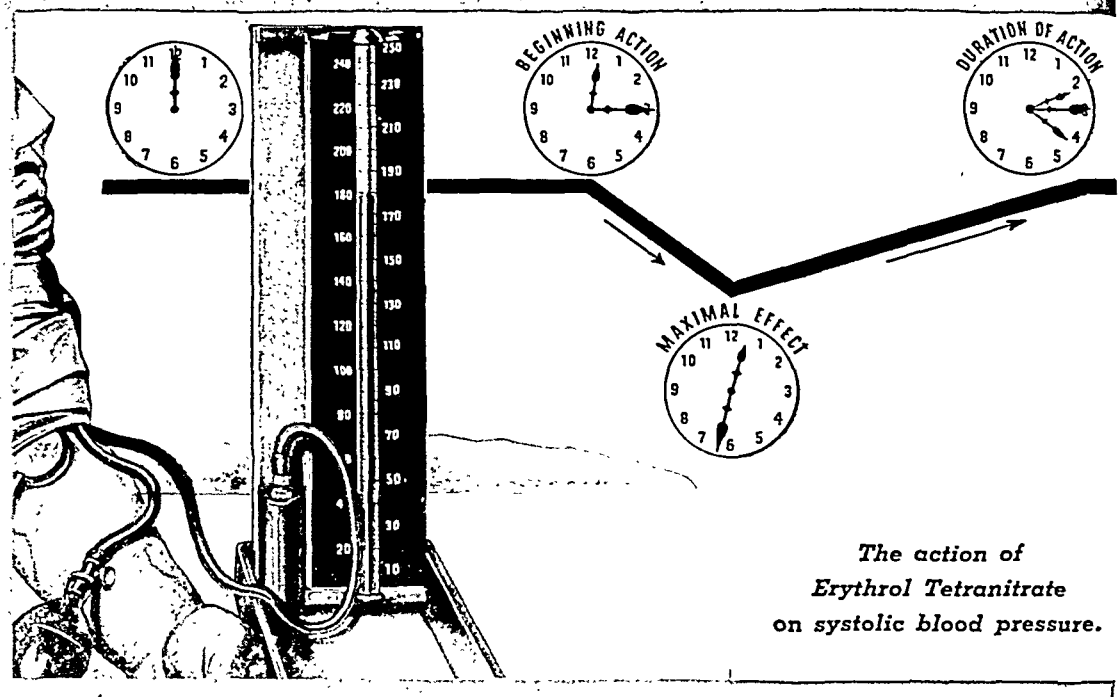
KNOX SPARKLING GELATINE

is PURE GELATINE—NO SUGAR

KNOX GELATINE LABORATORIES, Johnstown, N. Y.

Erythrol Tetranitrate

MERCK [Erythrityl Tetranitrate]



The action of Erythrol Tetranitrate on systolic blood pressure.

For reduction of high blood pressure

For the relief of, and as a prophylactic for, attacks of angina pectoris

For vascular diseases

- **Vasodilator action slower and more lasting than other commonly used nitrites.**
- **Vasodilatation usually begins within about fifteen minutes after administration and persists for 3 to 4 hours.**
- **Individualized dosage may be continued with sustained effect.**

Erythrol Tetranitrate Merck (Erythrityl Tetranitrate) is supplied in bottles of 50 ¼-grain tablets; tubes of 24, and bottles of 100 ½-grain tablets—readily obtainable from your pharmacist.

ACCEPTED AMERICAL MEDICAL ASSN.

MERCK & CO. LTD. *Manufacturing Chemists* Montreal, Que.

Salicylization Without Side-Effects

The modern trend in the treatment of rheumatism and associated conditions is complete and prolonged salicylate medication. Objections to this form of therapy have been based on either the ineffectiveness of small doses of salicylates or the intolerance to large doses.

In ALYCIN these disadvantages are overcome, because of the readily acceptable formula combining natural sodium, calcium and magnesium salicylates with a balanced alkali group. The large doses needed for complete salicylization are permissible when ALYCIN is used, because the carefully compounded formula prevents gastric disturbances or side-effects.

Use the coupon for complete dosage table and physician's sample.

The Wm. S. Merrell Company

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THE WM. S. MERRELL COMPANY,
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Gentlemen: Please send me sample of ALYCIN together with complete dosage table.

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Address .....

City ..... Prov. .....

GREATER SAFETY

In the Arsenical Treatment of Syphilis

500,000

1,000,000

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INJECTIONS OF MAPHARSEN HAVE BEEN ADMINISTERED WITHOUT ANY FATALITIES HAVING BEEN REPORTED

Mapharsen (meta-amino-para-hydroxy-phenylarsine oxide hydrochloride) is available in single dose ampoules containing 0.04 and 0.06 Gm., each in individual packages with or without distilled water. It is also supplied in ten-dose ampoules, containing 0.4 and 0.6 Gm., for use by hospitals and clinics.

PARKE, DAVIS & CO., Walkerville, Ont.

The World's Largest Makers of Pharmaceutical and Biological Products

BREAST SUPPORTS

An author* in the current medical literature, after reviewing the histories of 518 patients with carcinoma of the breast, gives the following practical suggestions which might prevent the development of precancerous lesions.

"1. More careful history-taking with an accurate analysis of the history . . .

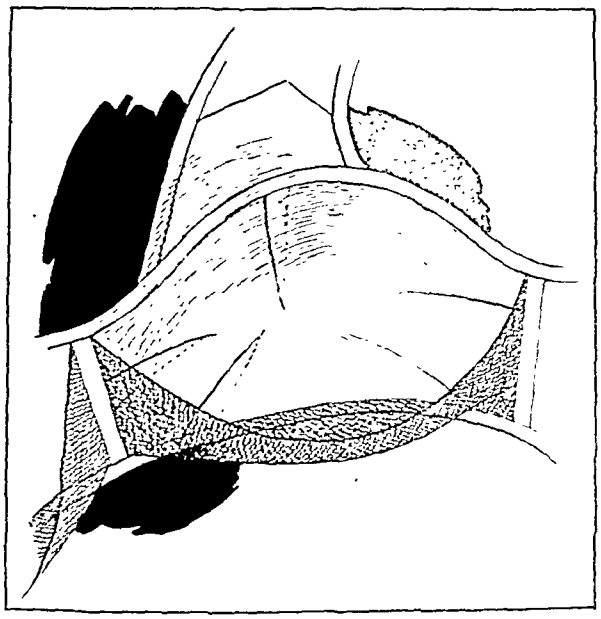
2. Education of mothers as to the necessity of nursing their babies . . .

3. If for any real reason the mothers are not able to nurse their babies, insistence on the use of a breast pump (preferably an electric one) . . .

4. More careful attention to the care of the nipples.

5. Correction of pelvic disorders especially when there is any pain in either breast during the menstrual periods.

6. More consideration to the proper support of the breast at all times."



Detail of pocket in bust compartment of opposite photograph (as seen from inside).



Support for heavy, pendulous and extremely pendulous breast.

The bust compartment of the Camp Breast Support (illustrated) is designed with an extra, inside, well-fashioned piece of material forming, with the outer fabric, a pocket into which the breast fits. Reinforcing pieces of fabric come from under the arm, circle around under the breast, serving as a shelf for support, and are attached to the opposite shoulder strap; these shoulder straps are provided with an elastic insert.

*Surgery, Gynecology and Obstetrics, Vol. 65, September, 1937.

CAMP TRADE MARK *Supports*

S. H. CAMP & COMPANY OF CANADA, LIMITED
Manufacturers
WINDSOR, ONTARIO, CANADA
London Office: 19 Hanover Square, London, W.1., England
WORLD'S LARGEST MANUFACTURERS OF SURGICAL SUPPORTS



To do One Thing well

To produce a suture which excels both in physiologic integrity and mechanical refinement calls for technical control, experience, and craftsmanship of a type not easily acquired. It is a work which well deserves the full time and attention of an organization created solely for this purpose.

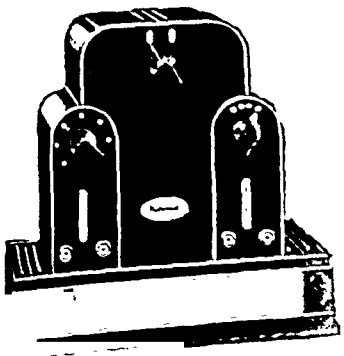
D & G Sutures

"THIS ONE THING WE DO"

DAVIS & GECK, INC. - - BROOKLYN, NEW YORK, U. S. A.

Obtainable from responsible Canadian dealers.

PAYS FOR ITSELF many times over!



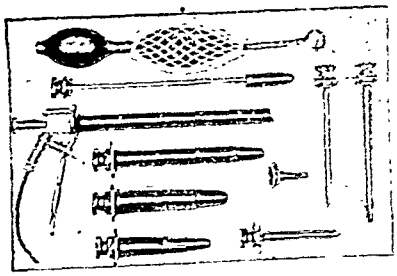
National Simplified Control Cautery Set

14 EXCLUSIVE FEATURES!

- The NEW National is the most IMPRESSIVE, most COMPLETE cautery every developed.
- The ONLY cautery supplied with the "Gyn-a-lite" vaginal speculum clip set.
- NO OTHER CAUTERY so easy to operate. (Note VISIBILITY of panel markings and SIMPLICITY of controls.)
- A larger, sturdier, Heavy-Duty device, that covers every cautery and diagnostic light requirement. BUILT TO LAST A LIFE-TIME.
- The ONLY cautery with the "Hidden Shelf," a compartment for the compact storage of cautery accessories.

National BODY CAVITY SET

All Cavities
•
Both Sexes
•
All Ages



Most versatile set ever developed!

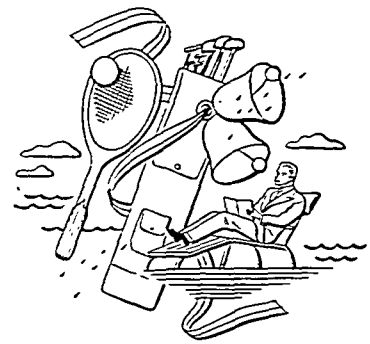
- For general practitioner, surgeon and gynecologist, for treatment of *all* body cavities.
- Obturator *lock*—Flashlight bulb.
- Adjustable magnifying *telescope.*
- For *infants, children* and *adults*—male and female—for rectal, vaginal and urethral examinations.
- Molded *insulated tubes* for coagulation and cauterization.

COUNTLESS OTHER FEATURES:

Set includes: "Neicomold" Sigmoidoscope—Proctoscope—Anoscope—Child Proctoscope—Tubular Vaginal Speculum—"Virgiscope"—Urethroscope—Stenescope.

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We make the WELCOME RING—TRUE!

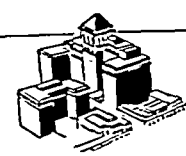
How desirable, when a guest visits you, that everything be just right—his room tasteful and in perfect order, the dinner a triumph, the servants eager to serve, the amusement beguiling.

That's the sort of a reception *you* receive at Chalfonte-Haddon Hall. Our standard of hospitality includes all the niceties of living, plus the fun and refreshment of a beachfront location. Long Ocean Decks. Superb food. Concerts and entertainment. Moderate rates. Restricted clientele.

LEEDS AND LIPPINCOTT COMPANY

CHALFONTE-HADDON HALL

ATLANTIC CITY



CANNED FOODS AND THE PUBLIC HEALTH

IV. Chemical Preservatives

● Some of our readers have inquired as to whether or not chemical preservatives are used in commercially canned foods. In certain instances, this question was inspired by the fact that "canning compounds" were formerly sold for use in home canning and preserving operations. Such compounds, however, are rarely used by the housewife of today, and never by commercial canners.

We wish to state here that *no preservatives are used in commercially canned foods.*

Spoilage of food is principally caused by the growth and multiplication in food of microorganisms such as yeasts, molds, or certain types of bacteria. These microorganisms depend upon the food they inhabit for their nutrition and their life processes produce changes in the chemical or physical characteristics of food, or both. These changes lead us to state that the food has "spoiled".

Like other living organisms, these spoilage microorganisms can grow and multiply in a food only as long as conditions remain favourable for their existence. If any environmental factor, such as temperature, moisture or acidity, becomes unfavourable, these spoilage organisms are destroyed, or their development is inhibited.

All methods of food preservation have a common underlying principle; they all alter some factor or factors in the food environment so as to render conditions unfavourable for the growth or development of spoilage organisms in the food.

Thus, foods may be preserved by freezing or refrigeration, which serves to lower the temperature below that optimum for growth of certain spoilage organisms; dried foods keep because the moisture content has been reduced to an unfavourably low level; certain fermented foods keep because of the development of high acidity. All of these methods produce changes in the environment in which the food spoilage organisms must live.

Commercial canning is a method of food preservation in which the temperature factor in the environment is raised to a level above that optimum for growth of spoilage microorganisms. Thus, canned foods keep because in their preparation they are subjected to heat processes in hermetically sealed containers. The thermal processes raise the temperature of the foods to those temperatures at which the most resistant spoilage organisms present cannot grow or survive. (1)

The hermetic seal insures protection against future infection of the food by such organisms.

Thus, commercial canning is a method of food preservation which has for its basis the thermal destruction of spoilage organisms; no chemical preservatives are needed to insure preservation of the foods, and, consequently, none are used.

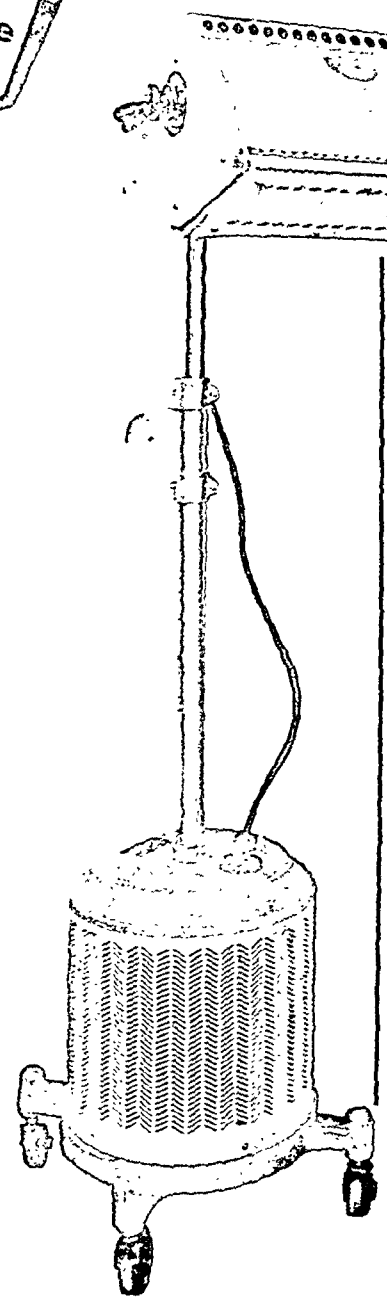
AMERICAN CAN COMPANY
MONTREAL - HAMILTON - TORONTO
AMERICAN CAN COMPANY, LTD. - VANCOUVER

(1) The Microbiology of Foods, F. W. Tanner; Twin City Pub. Co., Champaign, Ill., 1932.

HANOVIA LUXOR "S" ALPINE SUN LAMP

The Greatest Scientific Advance in Several Decades

QUARTZ MERCURY HIGH PRESSURE ULTRAVIOLET LAMP



HANOVIA ULTRAVIOLET RAY LAMPS have the approval and endorsement of the medical profession throughout the world. In the Luxor "S" we have PERFECTED A NEW PROFESSIONAL MODEL Alpine Sun Lamp that is more effective, economical to operate, simplified control, a definite time saver—guaranteed to render longer and more satisfactory service.

It is fitted with the latest improved burner—a truly remarkable development in ultraviolet generators.

Completely enclosed in a tube of the highest quality virgin quartz, the mercury arc is established between two solid electrodes of the activated type in a vapour atmosphere of high pressure, which develops the complete spectrum, including ultraviolet rays of short, medium and long wavelengths, the most effective spectrum for all therapeutic applications.

This new burner is scientific in principle, higher in its efficiency, lower in sensitiveness to temperature changes and voltage fluctuating It is constructed to absorb severe shocks without damage. Like all Hanovia mercury quartz generators the burner of the Luxor-S Alpine Sun Lamp delivers the COMPLETE Spectrum in the invisible ultraviolet band.

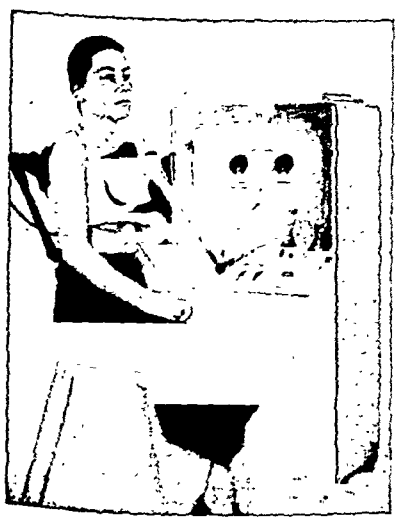
Doctors whose practice includes obstetrics, internal medicine, dermatology, pediatrics or orthopedics will find frequent occasions to employ this Hanovia Lamp. Particularly will the profession obtain splendid results in ultraviolet treatment of expectant mothers and infants.

•

Witness a demonstration in your local medical supply store.

FEATURES

1. Starts instantly at the snap of the switch, no more tilting necessary.
2. Builds up rapidly to full intensity — cools quickly, ready for relighting.
3. These fast moving operations save time and energy — important factors in a doctor's office.
4. Provides intense radiation and an even distribution over a wide shadowless surface.
5. Shorter treatment time.
6. Lower in original cost and economical to operate.
7. Longer useful burner life—another factor in economy.
8. *Simplicity of operation.*
9. Improved manipulative convenience.
10. Beautiful and sturdy in design.



HANOVIA ULTRA SHORT WAVE UNIT

This new, improved Hanovia Short Wave machine is the most efficient and rugged in the field today, offering the most simplified and convenient method of producing heat, deep within the tissues. Outstanding in quality, construction and efficiency it has among others, these *important* features:

Absolutely safe electrically — cannot give the slightest shock or electrical sensation.

Uniform "Electric Field" penetration with air spaced electrodes, resulting in a more even distribution of heat.

Patient circuit inductively coupled to oscillating circuit, permitting use of— Orificial electrode technique for pelvic temperature elevation, etc. 111° F. if *desired.*

Adequately designed — Noiseless — No cooling necessary.

HANOVIA Chemical & Manufacturing Co., Dept. 252-E, NEWARK, N.J., U.S.A.

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CORAMINE

"Ciba"

Coramine is a 25% aqueous solution of pyridine-B-carboxylic acid diethylamide, available in liquid form for oral use and in sterile ampoules for parenteral administration.

By a direct influence on the centre, it acts as a most efficient **respiratory stimulant,** increasing both the depth and the rate of respiration, either under normal conditions or when the centre is depressed by drugs or disease toxins. — Coramine **stimulates the heart,** leading to an increase in the output of blood; at the same time it tends to cause vascular relaxation, so that, with or without a rise in blood-pressure, the rate and efficiency of the circulation are improved.

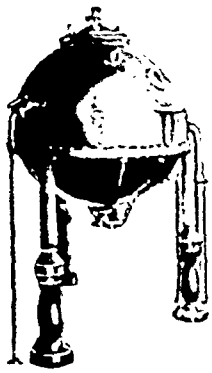
AMPOULES
(in cartons of 5, 20 and 100)

LIQUID
(for oral administration only)



759 Victoria Sq., Montreal.

How old is Pasteurization?

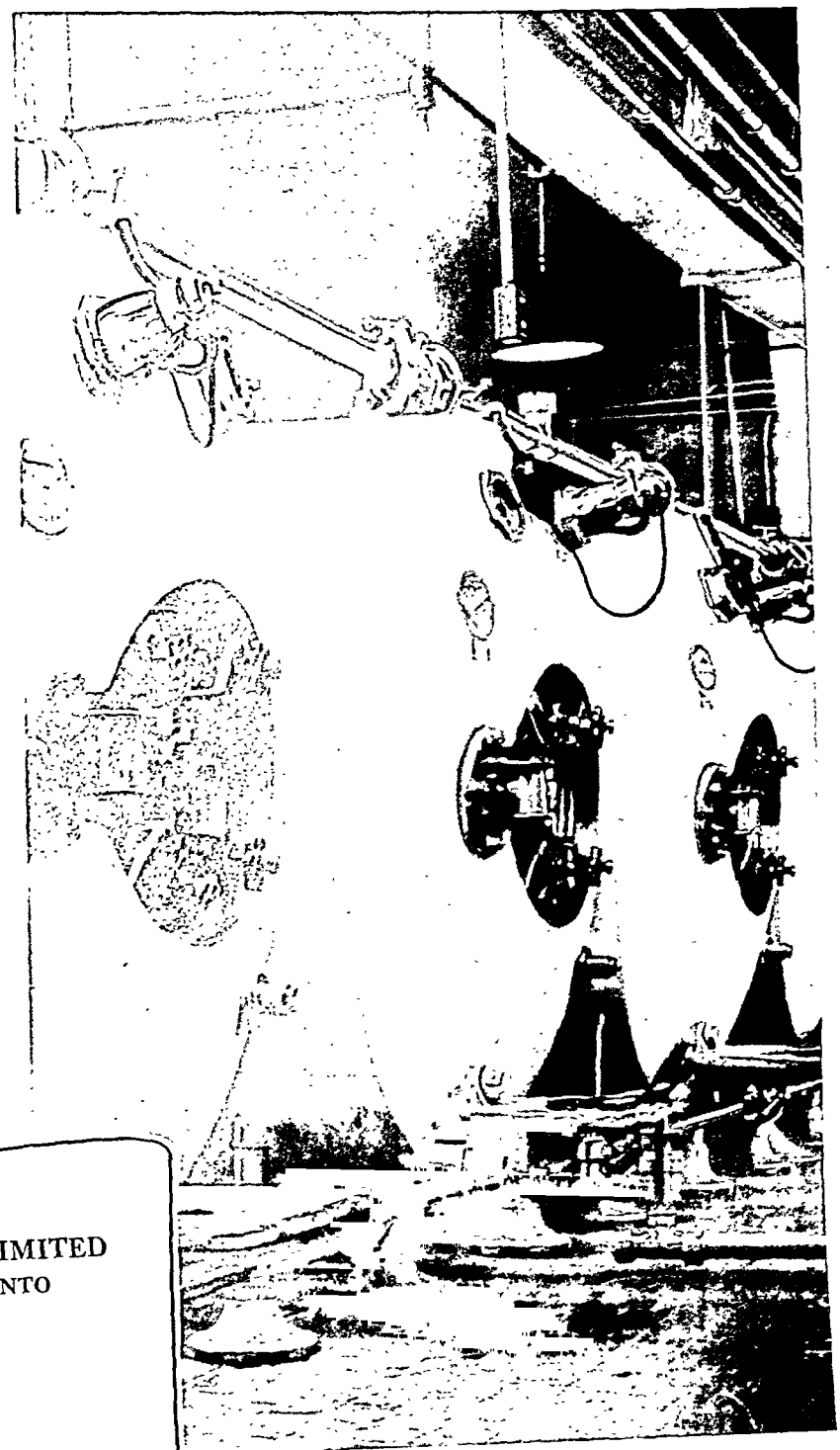


NEARLY HALF A CENTURY before pasteurization of market milk began to be adopted generally, Gail Borden, founder of The Borden Company, was literally "pasteurizing" milk with the strange-looking vacuum pan shown above.

Back in 1857 he applied heat to milk in a process that was equivalent to pasteurization. By trial and error, he discovered that clean milk could be made even more safe by such a beneficial process.

The Borden Company is today the foremost distributor of pure milk and dairy products that are pasteurized to give optimum protection to our most valuable food.

This Company continues heartily to support organized medicine and all progressive physicians in their endeavors to secure more universal pasteurization of milk.



The last word in milk-handling machinery—a battery of pre-pasteurization holding tanks at one of Borden's up-to-the-minute milk plants.

THE BORDEN COMPANY LIMITED
YARDLEY HOUSE - TORONTO



"... *the 'zodiac-man' indicates, as in drug-store almanacs of more recent date, the parts of the body influenced by the different planetary conjunctions, the proper times and places for bleeding and purgation under each sign of the zodiac. . .*"

Fielding H. Garrison,
History of Medicine.

FOR the relief of pain and other symptoms, bloodletting was once considered the remedy par excellence, and much consideration was given to the proper time and site for the venesection.

Today, more scientific and advanced methods are available for the control of pain and reduction of fever.

Outstanding in modern analgesic, anodyne and antifebrile medication is Aspirin, established through continuous use in medical practice for over 38 years.

Insist on Aspirin for your patients. Each tablet contains the *full dosage* of the *pure drug.*

We shall be glad to forward you professional samples of Aspirin on request.

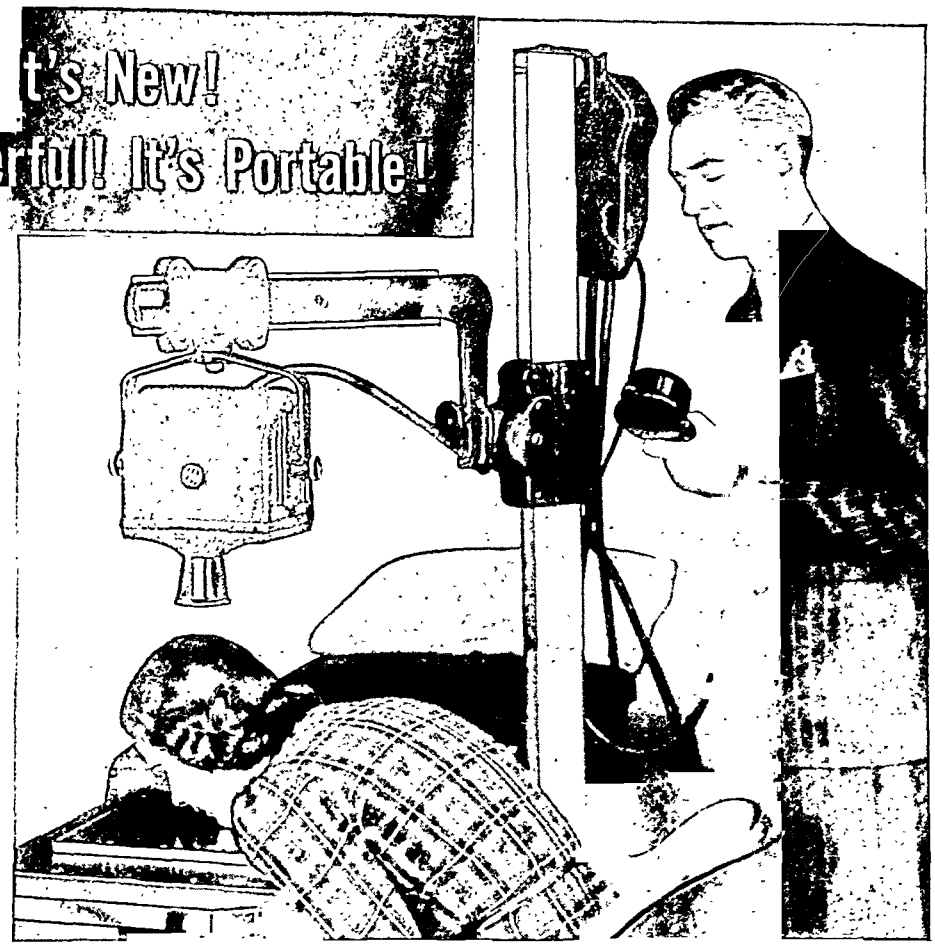


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Check This X-Ray Unit In Your Own Office

RIGHT in your own office see for yourself what this entirely new Office-Portable X-Ray Unit will do for you. Try this fine apparatus exactly as it will be used—on your office desk or table.

See for yourself how compact, powerful, flexible, and easy-to-operate the New F-3 really is. Pick it up, carry it, use and operate it in your own office—without cost or obligation. You will get convincing, personal proof—the F-3 will speak for itself.

If you're interested in seeing and actually using this unit, the finest portable x-ray ever offered to your profession, here's all you have to do: Just sign and mail the handy coupon; we'll do the rest.

WITHOUT OBLIGATION

By all means, make arrangements for me to see and operate the new F-3 X-Ray Unit in my office.

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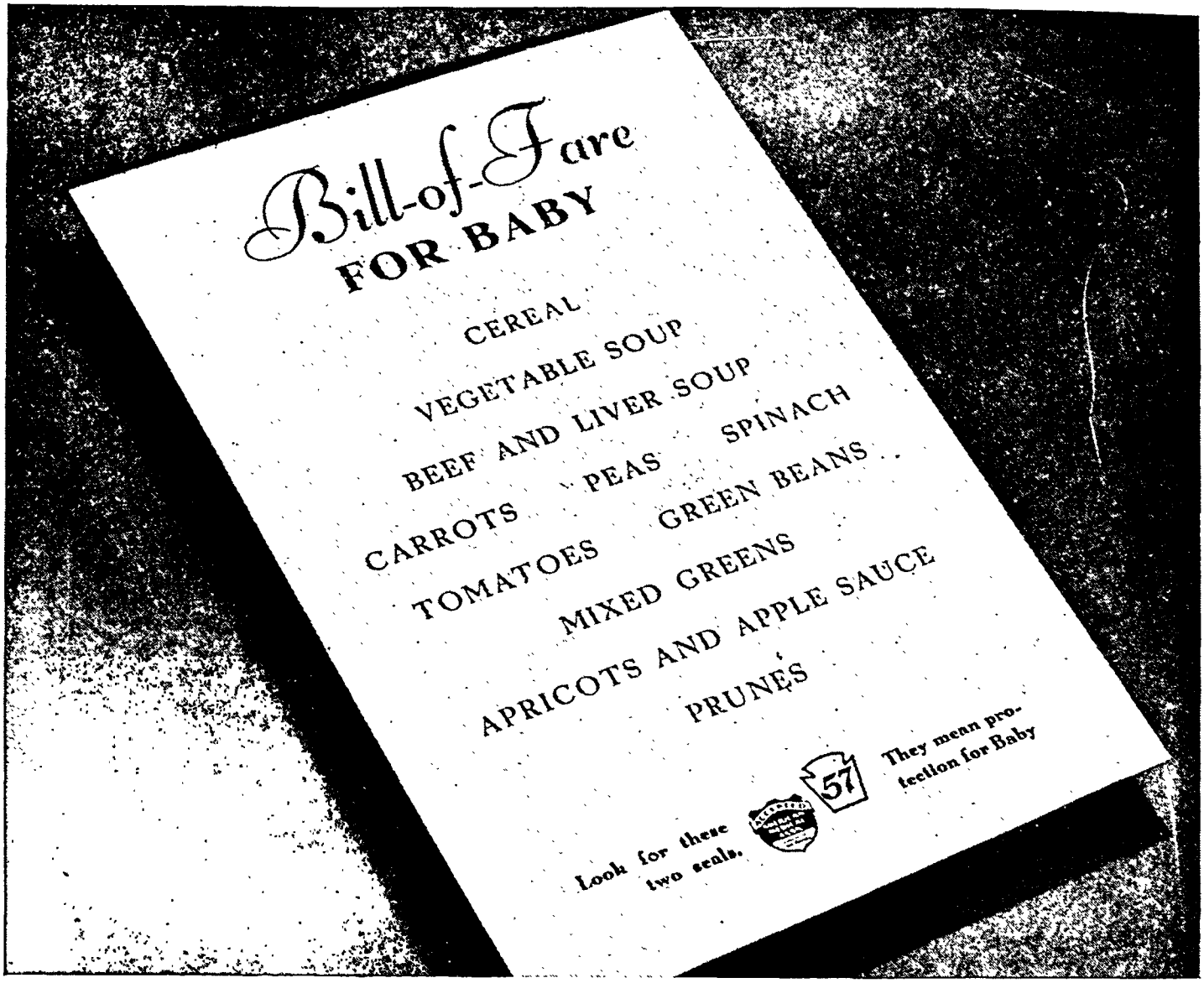
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12 STRAINED FOODS made according to a famous quality tradition

PHYSICIANS everywhere are coming to rely exclusively on Heinz Strained Foods for babies in their care. They accept the name Heinz as a warranty of high nutritive value—purity—superb flavour and freshness. And they *know* that these twelve delicious foods are made according to the finest quality tradition in the food industry!

Scientific Preparation

For one thing, Heinz has access to the best growing sources of first-choice fruits, vegetables, meats, and cereals. These are scientifically strained and packaged to insure the retention of vital nutrient elements. Furthermore—every tin of Heinz Strained Foods is stamped with the date of *its* manufacture. And all Heinz Strained Foods remaining on dealers' shelves after a limited period of time are replaced by absolutely fresh products!

Heinz Strained Foods are prepared at the company's plant in Leamington, Canada. Sample tins will be gladly sent free for your investigation. Address H. J. Heinz Company, Toronto, Ont.

12 KINDS

1. Vegetable Soup. 2. Mixed Greens. 3. Green Beans. 4. Beef and Liver Soup. 5. Spinach. 6. Tomatoes. 7. Peas. 8. Cereal. 9. Carrots. 10. Apricots and Apple Sauce. 11. Prunes. 12. Beets.

HEINZ STRAINED FOODS

A Noteworthy Advance in Eczema Therapy

An authoritative work on Eczema therapy states: "There has recently been perfected a colorless coal tar which has been tested by us in several hundred cases. It has proven as valuable as the black coal tar preparation, and the advantages of the diminution of the black color is perfectly obvious. . . . It does not stain the skin or clothing, nor does it burn or irritate the skin. We have seen no pustulation following its application. It can remain on the skin indefinitely without fear of dermatitis."*

The name is Supertah Ointment (Nason's). The coupon below brings samples without charge.

* Swartz and Reilly "Diagnosis and Treatment of Skin Diseases", p. 66-67.

In 5% and 10% Strengths

Supertah is a white, creamy ointment prepared from a concentrate of crude coal tar, uniformly milled in proportions to equal either a 5% or 10% crude tar ointment. Extensive clinical tests prove it equally as efficient as black tar ointments. More than 50,000 physicians have tested it in practice. In two years, physician's prescriptions have increased nearly 400%.

Coupon Brings Samples—Free

We invite you to try Supertah at our expense. The coupon below brings samples in both 5% and 10% strengths, without charge. Please give your complete address to assure prompt delivery.

SUPERTAH
(Nason's)

TAILBY-NASON COMPANY CMAJ 5-38
Kendall Square Station, Boston, Mass.
Samples, please.

Dr.....

Address.....

WHOLE MILK FOOD
For normal, healthy, artificially fed infants.

PARTLY SKIMMED FOOD
For Fat Intolerance or as an intermediary from special food diet to Whole Milk Food.

DALTOSE
A scientific carbohydrate mixture for infants and adults.

ALLERGILAC
Allergy in infancy.

FRAILAC
A food for frail and premature babies.

LACIDAC
A Lactic Acid Milk Food for all cases of Gastric Infection or Disturbance.

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An Iron Milk Food for the treatment of Nutritional Anæmia in infancy.



TRADITIONAL ENGLISH QUALITY

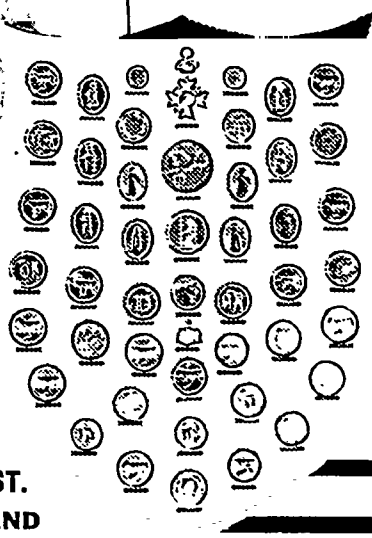
Now Made In Canada

. . . seven Royal babies have been raised on Cow & Gate Milk Foods.

. . . but this photograph is of Bobby Lacelle of Ottawa, who, his parents say, owes his life to Cow & Gate preparations.

. . . shows how admirably *Canadian* babies respond to these world-famous Foods.

. . . Cow & Gate Products have been awarded two Royal Warrants, in addition to winning 48 gold, silver and bronze medals, and 137 honors and awards.



COW & GATE (CANADA) LIMITED

GANANOQUE, ONT. TORONTO OFFICE, 19 MELINDA ST.

GUILFORD, SURREY - - LONDON, ENGLAND

Magnolax absorbs intestinal toxins

A unique therapeutic effect distinguishes Magnolax—a stable emulsion of liquid paraffin and milk of magnesia—from ordinary laxatives and cathartics. This property makes it of supreme value in the treatment of intestinal stasis.

Magnolax absorbs and carries out of the system various harmful and putrefactive products, such as indol, phenols and other intestinal toxins.

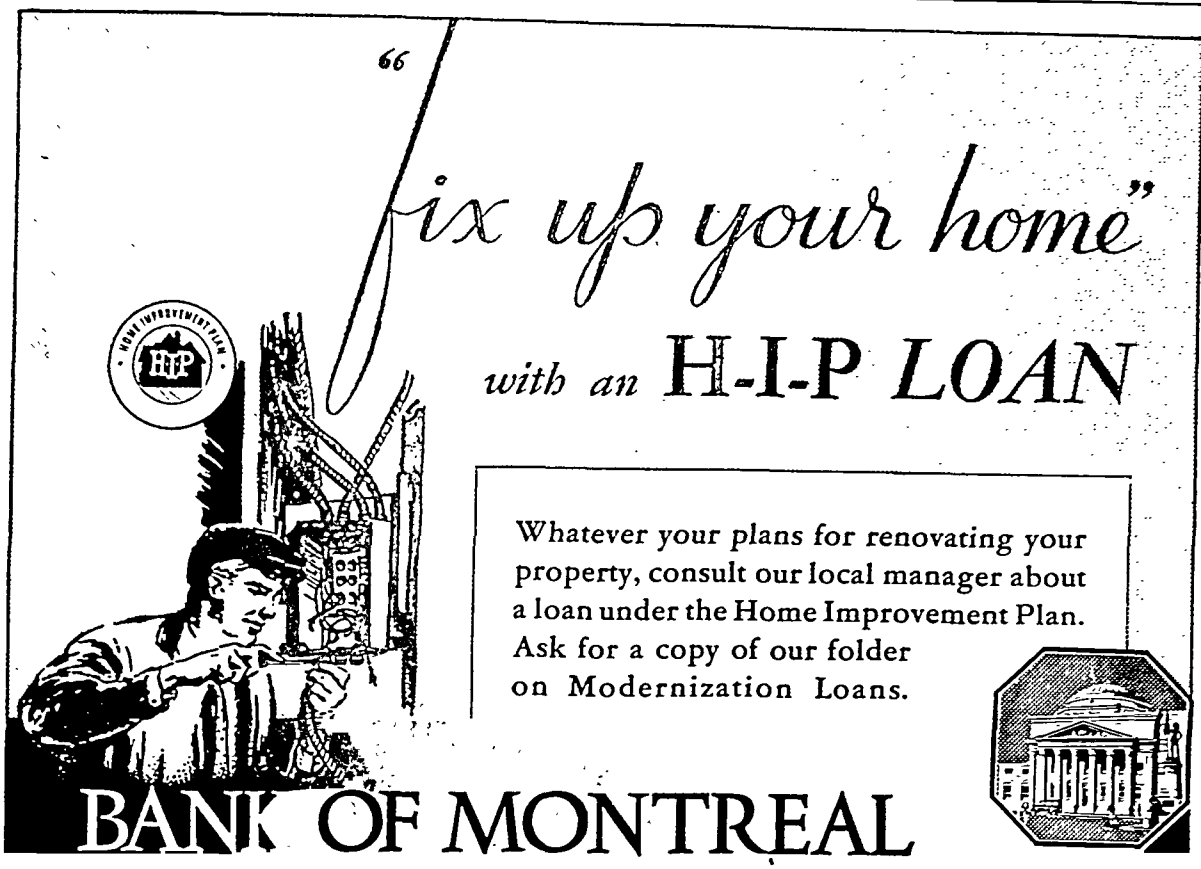
And Magnolax does not contain phenolphthalein which may irritate the colon and cause damage to the liver in sensitive persons, especially children.

Samples for clinical trial to physicians on request.

HENRY K. WAMPOLE & CO., LIMITED

Manufacturing Pharmacists

PERTH, ONTARIO, CANADA



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INTERNAL MEDICINE—DIAGNOSIS AND TREATMENT
June 20—July 30 (6 weeks). Massachusetts General Hospital. Fee, $200.

MODERN DIAGNOSIS AND TREATMENT OF HEART DISEASE
July 1-30. Peter Bent Brigham Hospital. Fee, $150.

PEDIATRICS
July 1-30. Massachusetts General Hospital. Fee, $125.

CARDIOLOGY—ADVANCED CARDIOLOGY
Cardiology, August. Advanced Cardiology, September. Massachusetts General Hospital. Fee, $150. per course.

For further information regarding the above courses apply to the Assistant Dean, Courses for Graduates.

HARVARD MEDICAL SCHOOL - - - BOSTON, MASSACHUSETTS

EDINBURGH POST-GRADUATE COURSES IN MEDICINE

IN CONNECTION WITH THE UNIVERSITY AND ROYAL COLLEGES, 1938

The POST-GRADUATE COURSES to be held this year comprise:

(1) A COURSE IN OBSTETRICS AND GYNÆCOLOGY from July 11th to July 29th. Fee: £10. 10s.
(2) A GENERAL PRACTITIONERS' COURSE from August 15th to September 10th. Fee: £10. 10s. for whole course; £6. 6s. for two weeks.
(3) A GENERAL SURGICAL COURSE from August 15th to September 10th. *Fee: £10. 10s. for whole course; £6. 6s. for two weeks.*
(4) A COURSE ON INTERNAL MEDICINE from October 17th to December 10th. Fee: £15. 15s.

In addition to the above, Courses in the following Subjects will be held at various periods of the year:

INTERPRETATION AND SIGNIFICANCE OF MODERN DIAGNOSTIC METHODS. Fee: £3. 3s.
DISEASES OF THE BLOOD. Fee: £3. 3s.
ENDOCRINOLOGY. Fee: £3. 3s.
DISEASES OF THE NERVOUS SYSTEM. Fee: £3. 3s.
UROLOGY. Fee: £10. 10s.
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UROLOGICAL SURGERY. Fee: £3 3s.
TREATMENT OF FRACTURES AND ORTHOPÆDICS. Fee: £3. 3s.
NEUROLOGICAL SURGERY. Fee: £2. 2s.
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Further particulars may be had on application to the Hon. Secretary, Post-Graduate Courses in Medicine, University New Buildings, Edinburgh

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EXAMINATIONS — OCTOBER 1938

The Primary and Final Examinations leading to the Diploma of Fellow will be held on the following dates:—

Written Examinations in both the Primary and Final subjects on October 3rd, 4th and 5th — in Vancouver, Edmonton, Saskatoon, Winnipeg, Toronto, Montreal, Quebec City, Halifax.

Oral Examinations in the Primary Subjects on October 20th in Winnipeg and October 22nd in Toronto.

Oral and Clinical Examinations in the Final subjects on October 24th in Winnipeg and October 26th in Toronto.

The Annual Meeting of the College will be held in Ottawa on October 29th.

Candidates who are graduates of 1930 or prior thereto of a Medical School or University approved by Council shall not be required to take the Primary Examination, but shall in the Final Examination demonstrate a general and practical knowledge of the clinical application of Anatomy and Physiology.

This special examination shall be conducted by clinicians.

The privilege of this subsection of the Bylaws shall become obsolete on December 1st, 1940.

Address all communications to:

Warren S. Lyman, M.D., F.R.C.P.(C.)
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Further details will appear in subsequent issues.

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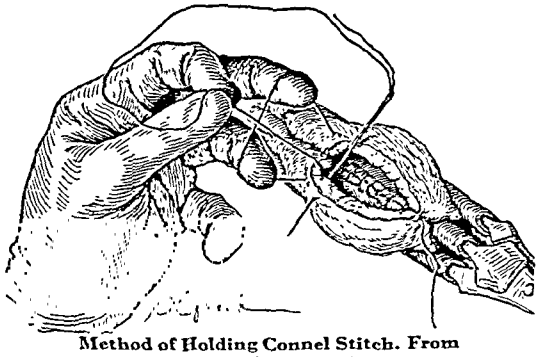
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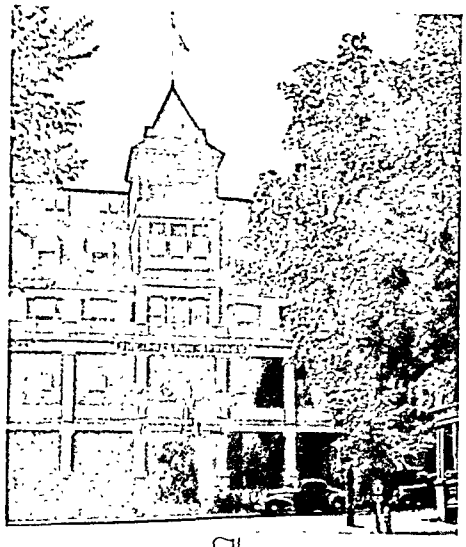
Urology	June 13 to June 25—St. Peter's Hospital. All day. Fee £5. 5s. *(Maximum of 8).*
M.R.C.P. (Chest)	May 30 to June 24—Brompton Hospital. Two afternoons weekly. 5.15 to 6.15 p.m. Fee £3. 13s. 6d. *(Maximum of 6 per class).*
M.R.C.P. (Neurology)	June 13 to June 25—West End Hospital for Nervous Diseases. Afternoons. Fee £3. 10s. *(Maximum of 10).*
Medicine, Surgery and the Specialties...	June 27 to July 9—Prince of Wales' General Hospital. All day. Fee £5. 5s.
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Urology	July 11 to July 30—All Saints Hospital. Afternoons. Fee £2. 12s. 6d.
Dermatology	July 11 to July 23—Hospital for Diseases of the Skin, Blackfriars. Afternoons. Fee £1. 1s.
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*Cardiology	October 3 to October 15—National Hospital for Diseases of the Heart. All day. Fee £7. 7s. *(Maximum of 20).*
Medicine, Surgery and the Specialties	October 3 to October 8—Metropolitan Hospital. All day. Fee £3. 3s.
*Dermatology	October 3 to October 31—St. John's Hospital. Afternoons. Fee £1. 1s. November 1 to November 30— per month. (Practical Pathology arranged. Fee £4. 4s.).
Gynæcology (Suitable for M.C.O.G.)	October 10 to October 22—Chelsea Hospital for Women. All day. Fee £5. 5s. *(Maximum of 15).*
Chest Diseases	October 24 to October 29—Brompton Hospital. All day. Fee £3. 3s.
Urology	October 24 to November 5—St. Peter's Hospital. All day. Fee £5. 5s. *(Maximum of 8).*
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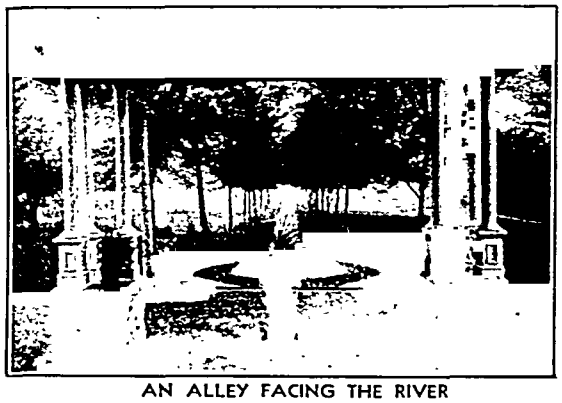
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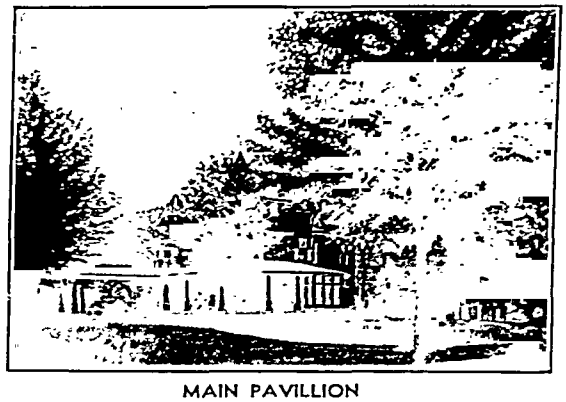
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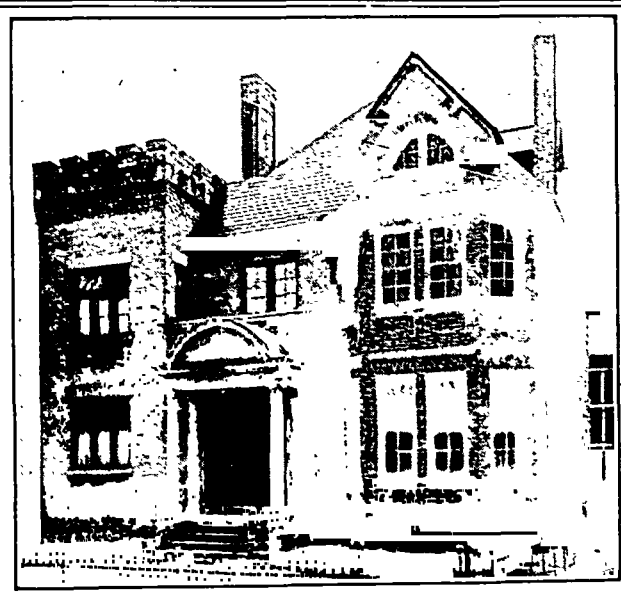
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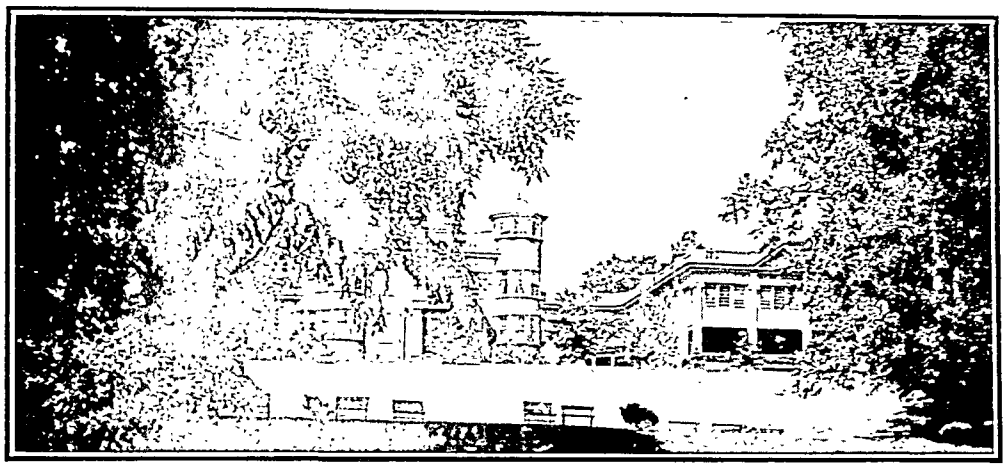
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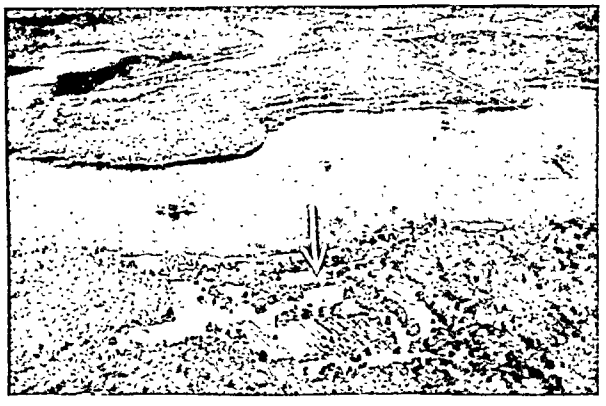
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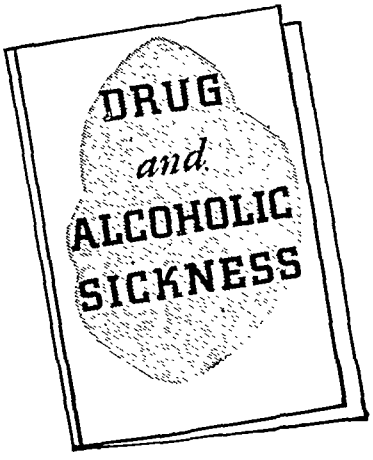
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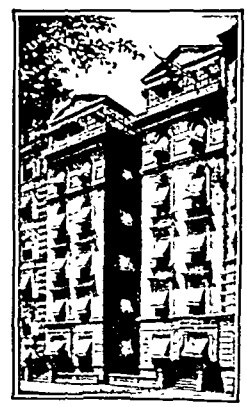
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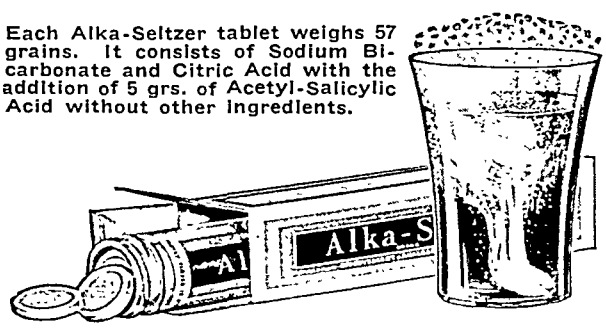
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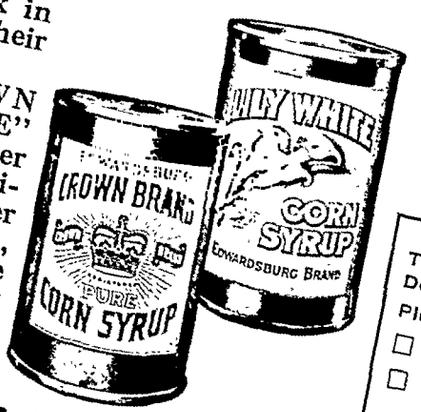
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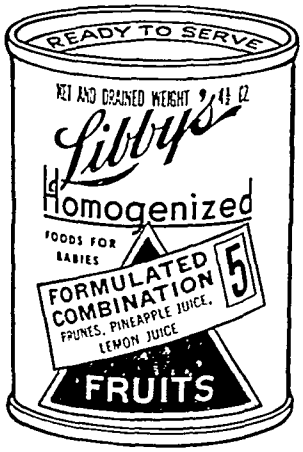
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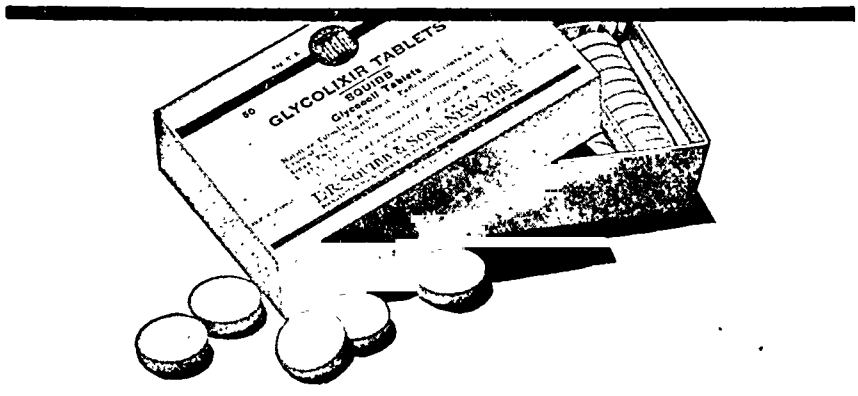
3 Spinach, carrots, peas.

4 Cereal . . . whole milk, whole wheat, soya bean flour

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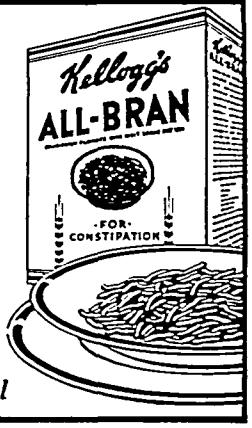
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ORIS, the mouth)

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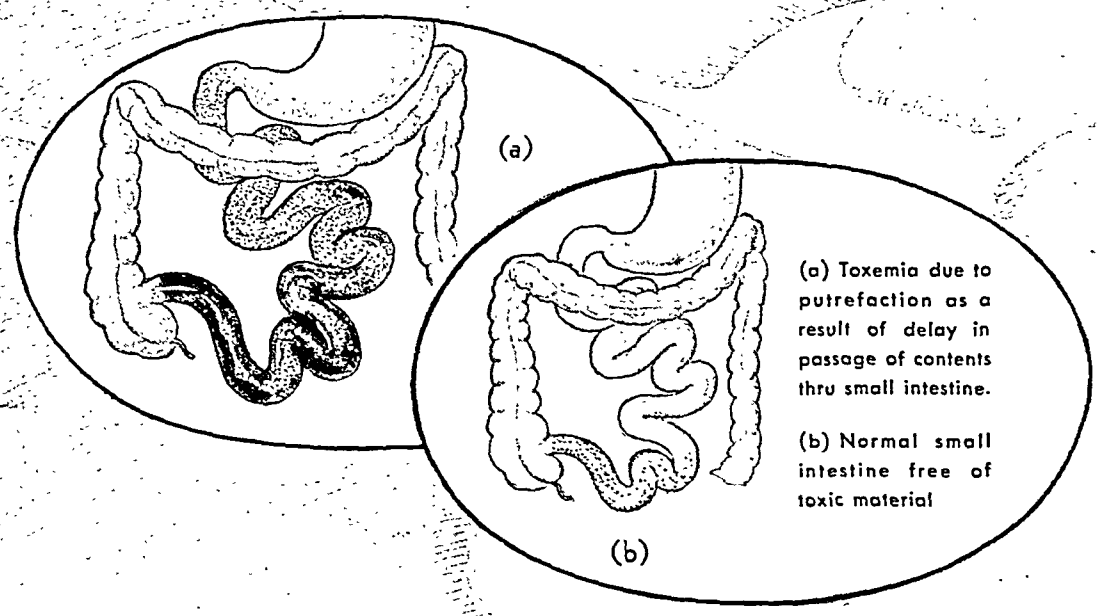


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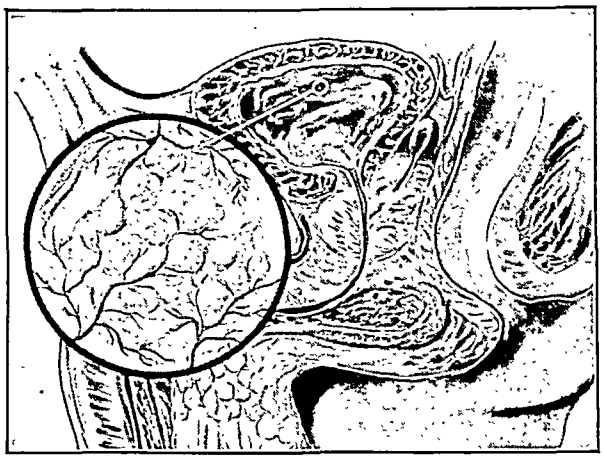
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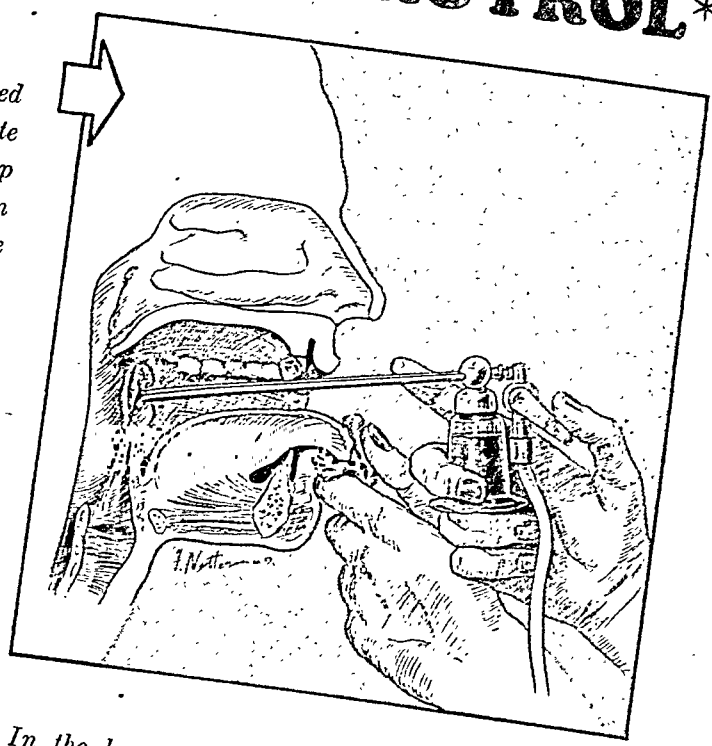
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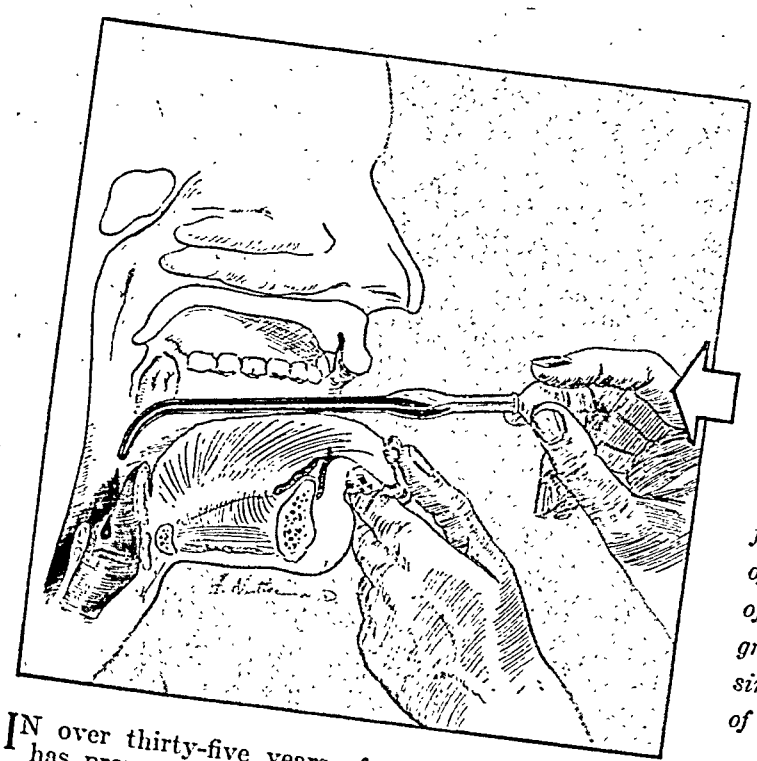
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Are the Neuritic Symptoms of Pregnancy *due to a deficiency of vitamins B1 and G?*

SUCH common neuritic symptoms of pregnancy as pains in arms and legs, muscle weakness, and (less frequent but more serious) paralysis of the extremities may result from a shortage of antineuritic vitamins, recent investigations appear to show. Although neuronitis of pregnancy has long been considered a toxemia, no toxins have ever been identified.

Clinical observations of Strauss and McDonald lead to the conclusion that the condition is a dietary deficiency disorder similar to beriberi, caused by lack of vitamin B_1, complicated by symptoms which may be traced to shortage of vitamin G. They report recovery in their cases receiving this therapy, including dried brewers' yeast.

Hyperemesis as Cause of Avitaminosis

Wechsler observes that all cases of polyneuritis of pregnancy recorded in the literature were preceded by long periods of severe vomiting. "It would seem," he adds, "that because of actual starvation these patients suffered from avitaminosis and consequent neuritis," a view likewise held by Hirst, Luikart, and Gustafson. Plass and Mengert observe that the practice of giving high carbohydrate feedings for hyperemesis gravidarum is still more likely to cause avitaminoses B and G.

Dried brewers' yeast, as it is far richer than any other food in vitamins B_1 and G, is being used with benefit both in the prevention and treatment of polyneuritic symptoms of pregnancy. Lewy found that additions of yeast to the diet reduced electric irritability of the peripheral nerves and brought clinical improvement. Vorhaus states that he and his associates, after administering large amounts of vitamin B_1 to 250 patients having various types of neuritis, including that of pregnancy, observed in about 90% of cases "varying degrees of improvement, i.e., from partial relief of pain to complete disappearance of all symptoms."



Need for Vitamins B and G in Lactation

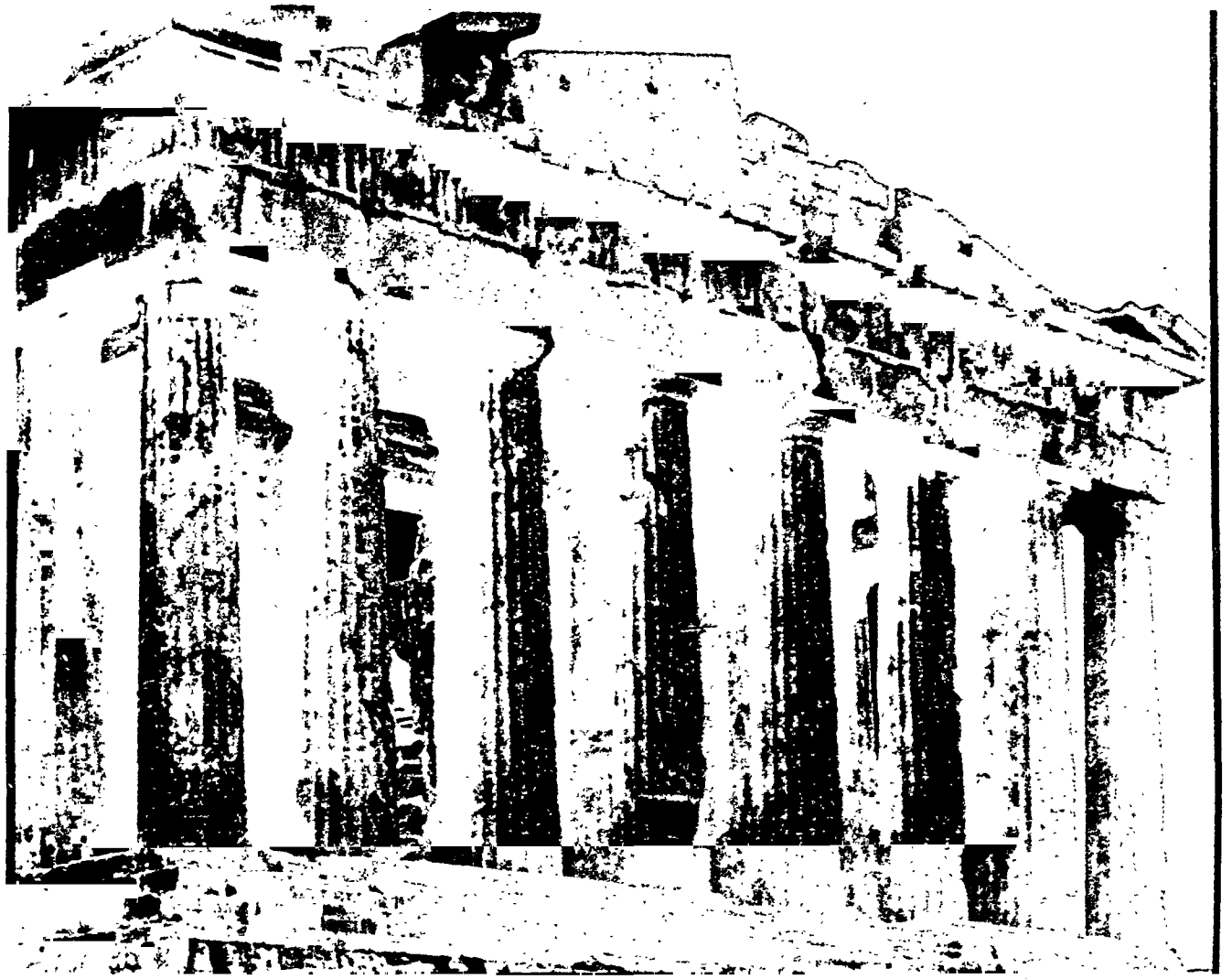
Evans and Burr, Hartwell, Sure and co-workers, and Macy *et al* are among numerous authorities who find that the nursing mother also needs supplements of vitamins B_1 and G, from 3 to 5 times the normal requirement. Tarr and McNeile report that the physical, mental, and emotional status of 120 pregnant and lactating women receiving Mead's Brewers Yeast and other foods high in vitamin B was superior to that of a control group of 116 women.

Since the management of polyneuritis of pregnancy is difficult at best, it would appear logical to supply those dietary substances which may safeguard against it. One of the richest and most convenient sources of the anti-neuritic factors, vitamins B_1 and G, is Mead's Brewers Yeast Tablets. Consisting of nonviable yeast, they offer not less than 25 International vitamin B_1 units and 42 Sherman vitamin G units per gram.

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Vol. 38 JUNE, 1938 No

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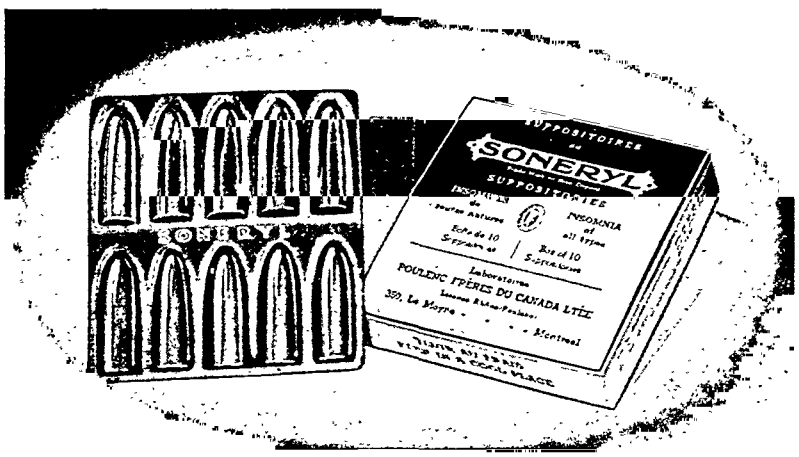
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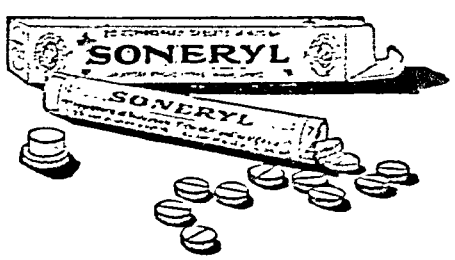
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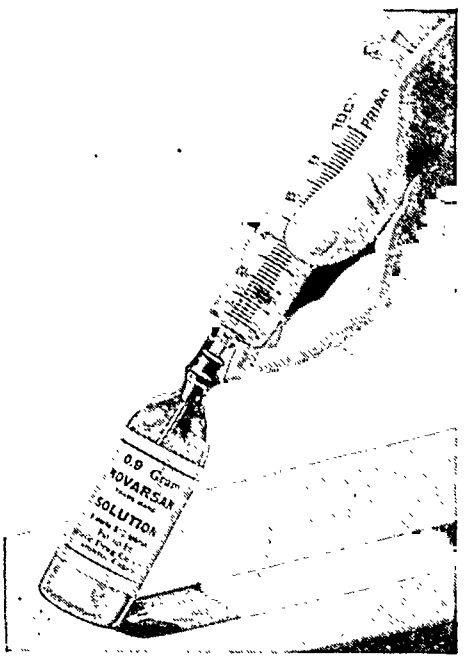
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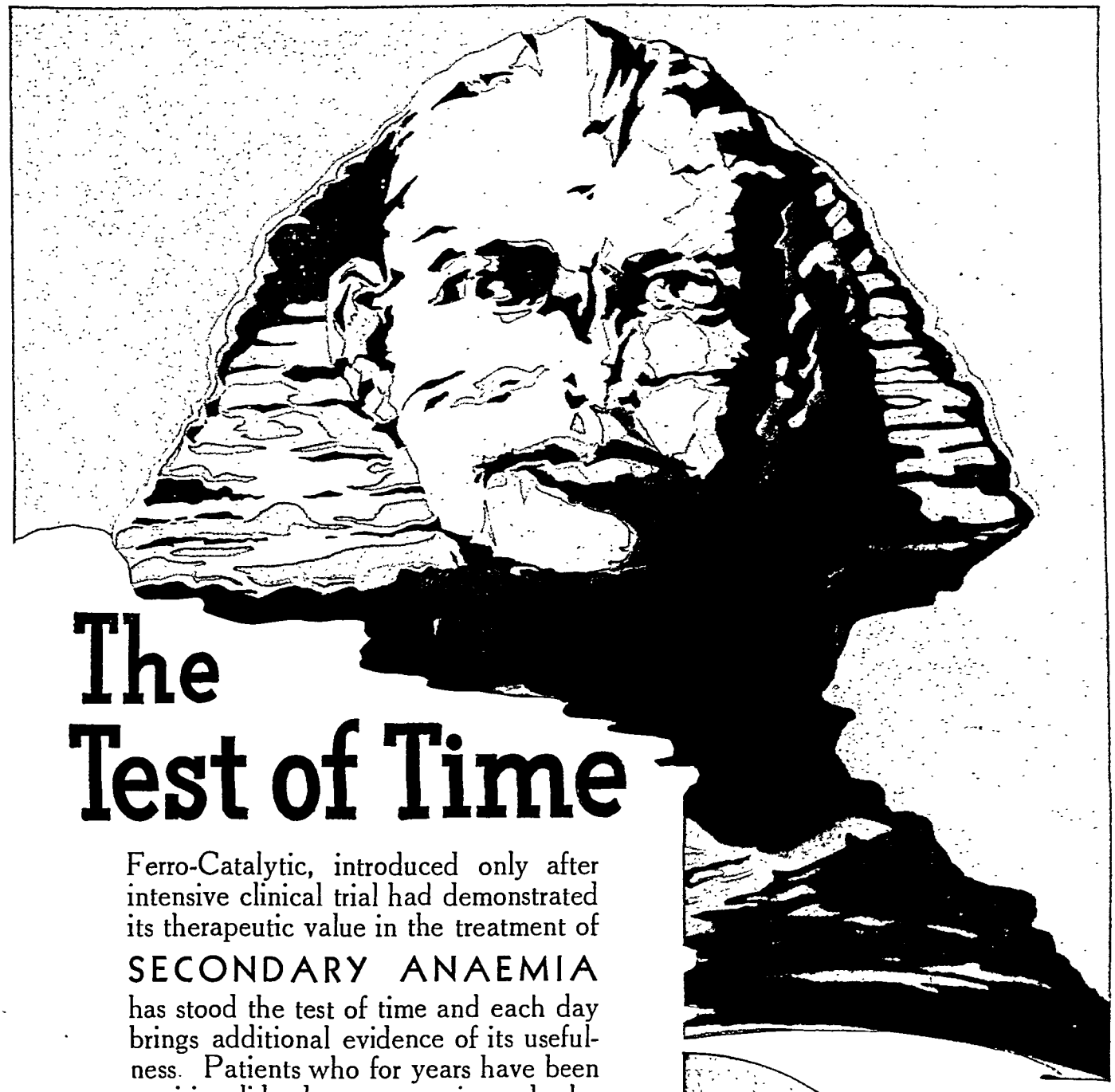
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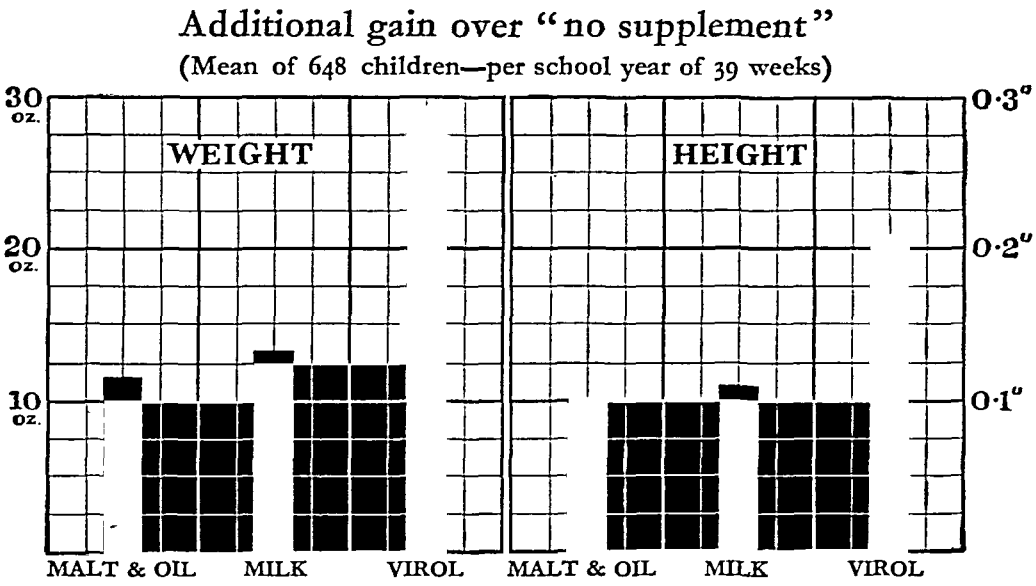
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An investigation, recently published in the medical press*, was conducted on 864 children from schools in the North and South of England. A statistical comparison was made of their growth-rates on their ordinary home diet with those obtained by the addition of various supplements of equal calorific value. The experiment lasted for one school year.

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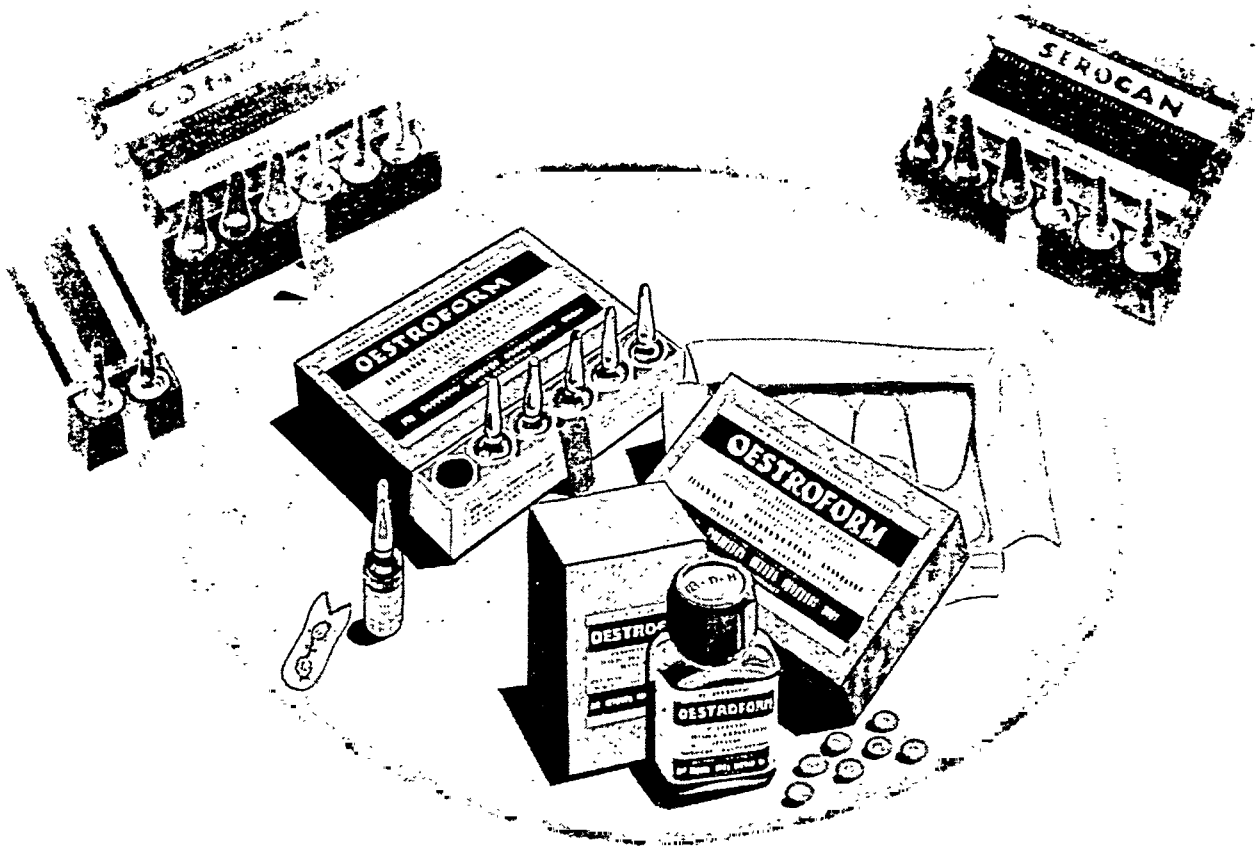
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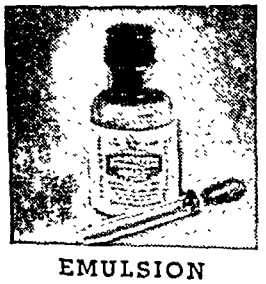
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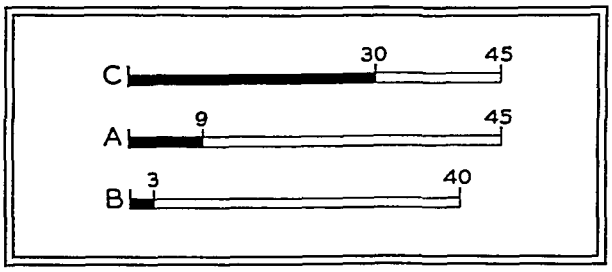


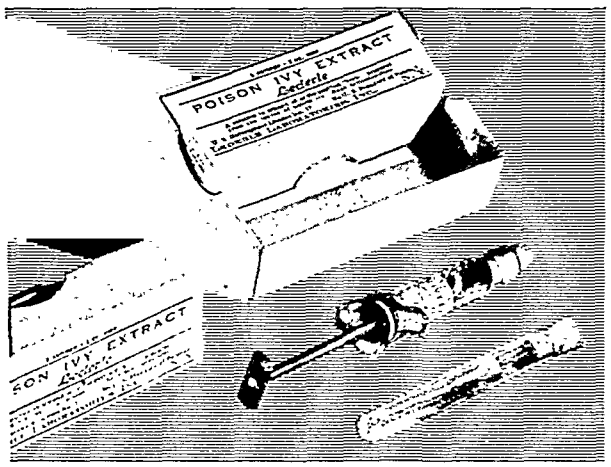
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Group C received no previous injections.

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The shaded areas represent the number of exposed men affected with ivy dermatitis in the 6-week period.



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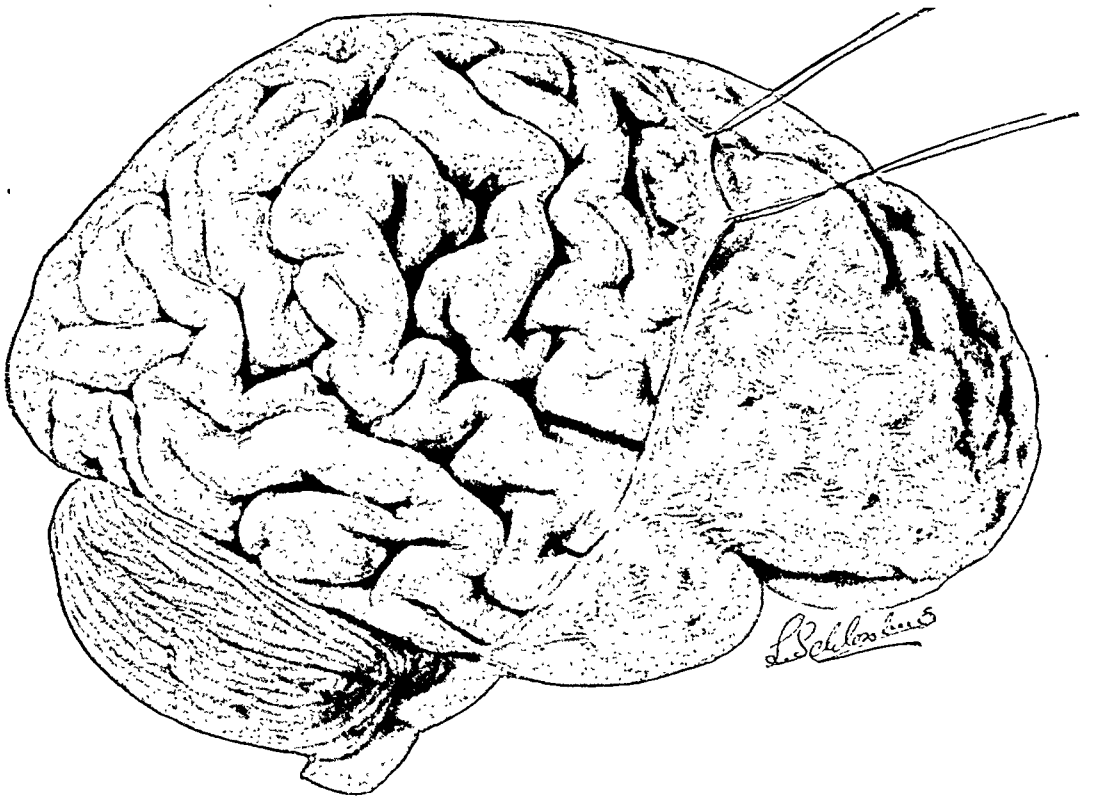
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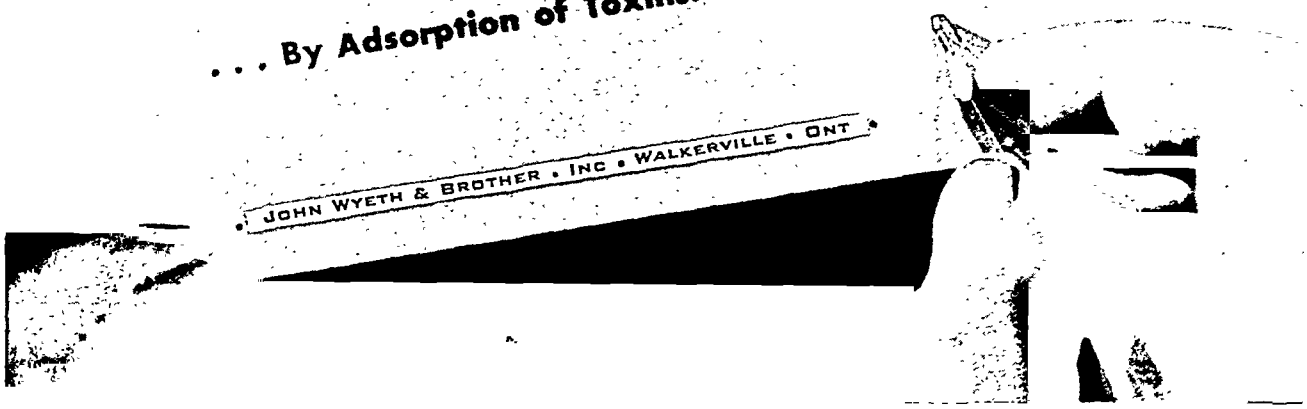
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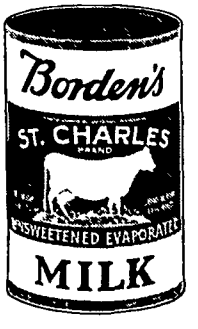
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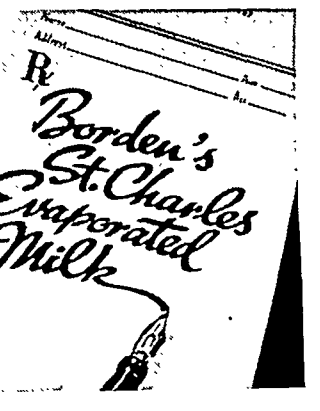


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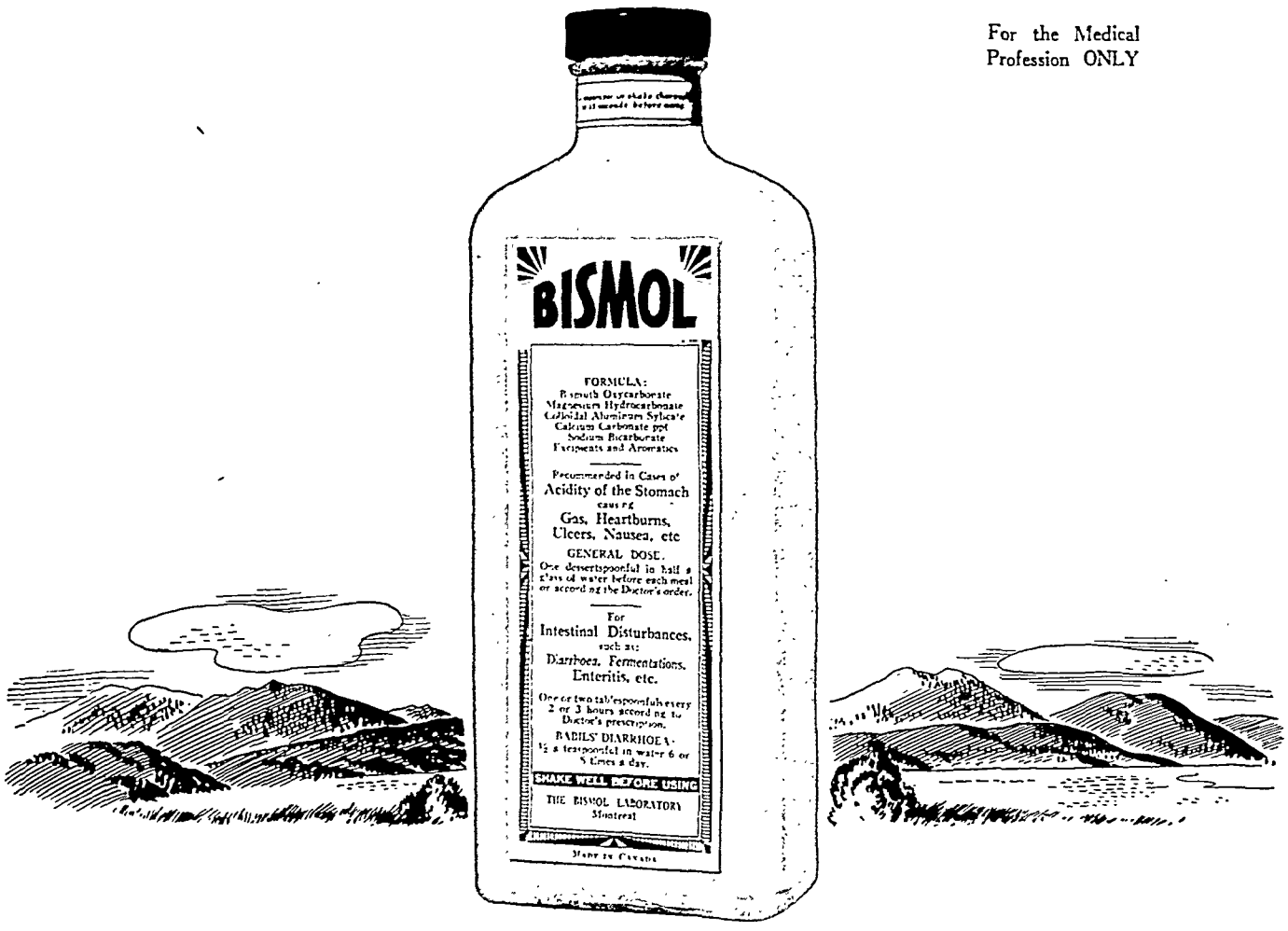




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Editor

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1938

INDEX TO VOLUME 38

The following contractions are used in regard to the indexed material: (Ab)—Abstracts; (C)—Correspondence; (E)—Editorial; (Ob)—Obituary; (Ret)—Retrospect.

A

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AN ATTEMPT TO INHIBIT THE DEVELOPMENT OF TAR-CARCINOMA IN MICE

(FOURTH REPORT)

THE EFFECTS OF VITAMINS ON THE TUMOUR THRESHOLD

BY J. R. DAVIDSON

Winnipeg

THIS study is the termination of three preliminary reports.[1]

Two mice, male and female, with tar-carcinoma present, were bred twice and their offspring divided into seven divisions. The first and seventh divisions were given a diet with sufficient vitamin content to maintain a normal healthy mouse, division one, a synthetic diet, and division seven a natural diet. The mice in these two divisions were treated (tarred) to produce growths, then bred, and their offspring used as control mice in this series. The mice in the remaining divisions were on a diet with a higher vitamin content, with the exception of division two, which was on the same diet as division one. Division six was on the same diet as division seven. Divisions two, three, four, five and six, were not treated, but allowed to breed naturally, to determine any variation in the tumour threshold of the mice on varying amounts of vitamins in the diet.

There was no mating in division two. Later the male mouse was replaced by the male in division one, as there was no corresponding male available. The offspring from division two was from a treated male and untreated mothers, so that the tumour threshold of the offspring from division two would be little altered from that of division one.

By the time the offspring of divisions one and seven were ready for the series, the offspring from the other divisions had reached from two to four generations, as follows:

Division	1	2	3	4	5	6	7
Generation ..	1st	2nd	4th	4th	3rd	3rd	1st

The mice of the last generation of each division were divided into two groups, group (*a*) and group (*b*). Group (*a*) was placed on the low vitamin content diet (control diet), and group (*b*) on the diet high in vitamin content.

DIETS

CONTROL DIET

Similar to Evans "E" free diet, with ½ ounce of wheat germ oil added. The following makes about 25 ounces of ration.

Casein	7 oz.
McCallum salts	1 "
Brewer's yeast	2½ "
Cod liver oil	½ "
Wheat germ oil	½ "
Lard (fresh)	4½ "
Cooked corn starch	14 "

HIGH VITAMIN CONTENT DIET

This diet has a higher vitamin content (HVC).

Casein	7 oz.
McCallum salts	1 "
Brewer's yeast	5 "
Cod liver oil	½ "
Wheat germ oil	1 "
Lard (fresh)	3½ "
Cooked corn starch	14 "

Three drams of a highly concentrated vitamin "A" (30,000 international units per g.) were added.

Table I represents the results of an attempt to produce tar-carcinoma in divided litters of susceptible mice and mice which had been bred to raise the tumour threshold, and then fed on two diets varying in vitamin content. Mice that died previous to May 28, 1937, are not included in the results shown in Table I.

The remaining mice at April 15, 1938, were destroyed, and a histological examination made of all the growths. A post-mortem examination was made on a sufficient number of mice apparently free from growths, to ascertain whether

or not any internal growths or metastases were present. When the absence of these was confirmed the data of similar mice were placed in the records of Table I as being free from tar-carcinoma.

The result in this series of mice demonstrates that the tumour threshold of the mouse can be altered through adjustment of the constitutional development of the animal, the amount of vitamin content in the diet, and tar-irritation, as follows. (1) The tumour threshold can be lowered by tar-irritation, low vitamin content diet, and breeding, thereby obtaining 100 per cent of cancer. (2) When the offspring of susceptible mice are divided and placed on two different diets, one low in vitamin content and the other high, the mice on the low-vitamin content diet develop tar-carcinoma as usual, but few mice on the high vitamin content diet develop the growth. (3) When susceptible mice are placed on a high-vitamin content diet, untreated, and allowed to breed naturally for a few generations, then placed back on a low-vitamin content diet and kept under the same conditions as the susceptible mice to produce tar-carcinoma, few are found with the growth present.

This study of mice was undertaken to ascertain the reason why the symptoms of a patient suffering from carcinomatosis should disappear and the patient apparently return to normal health while on a diet high in vitamin content, and, later, when she returned to her former mode of living on the farm the symptoms should reappear, the patient dying about a year later from cancer (Case 1).

CASE 1

Mrs. W. (Winnipeg Gen. Hosp., No. 10162), a farmer's wife, aged 51 years, weighing 102 pounds, married fifteen years, no family, was admitted to the Winnipeg General Hospital, December 5, 1931, and came under my care.

TABLE I.

The last generation of each division was divided into two groups, group (*a*) and group (*b*). Group (*a*) was placed on low-vitamin content (control diet) and group (*b*) on high-vitamin content diet. All mice were tarred every 3rd day for 27 times. All mice received raw milk and water once a day.

Group	*Average age (months)*	*Number of mice*	*Diet*	*Tarrings*	*Remaining mice May 28/37*	*Remaining mice destroyed April 15/38*	*Tar-carcinoma present at death*
Gr. (*a*), Div. 1	2-2½	8 M	C.D.	27	4	0	4 (Control group).
Gr. (*b*), Div. 1	2-2½	7 (3 M, 4 F)	HVCD	27	7	3	1
Gr. (*a*), Div. 2	2-2½	7 F	C.D.	27	7	3	6 (M parent from Gr.
Gr. (*b*), Div. 2	2-2½	8 F	HVCD	27	8	4	1 (*a*), Div. 1 used.)
Gr. (*a*), Div. 3	2-2½	6 F	C.D.	27	6	6	0
Gr. (*b*), Div. 3	2-2½	6 M	HVCD	27	4	0	0
Gr. (*a*), Div. 4	2-2½	6 M	C.D.	27	6	2	0
Gr. (*b*), Div. 4	2-2½	8 F	HVCD	27	7	5	0
Gr. (*a*), Div. 5	2-2½	7 F	C.D.	27	7	5	1
Gr. (*b*), Div. 5	2-2½	6 M	HVCD	27	4	1	0
Gr. (*a*), Div. 6	2-2½	7 F	C.D.	27	7	5	2
Gr. (*b*), Div. 6	2-2½	7 M	HVCD	27	5	3	0
Gr. (*a*), Div. 7	2-2½	6 M	C.D.	27	6	0	6 (Control group).
Gr. (*b*), Div. 7	2-2½	7 F	HVCD	27	7	2	3

Code to abbbreviations:
M—Male. F—Female. Gr—Group. Div.—Division. C.D.—Control diet.
HVCD—High-vitamin content diet.

Entrance complaints.—Headache with severe neuralgic pains in right side of head; a lump in the right upper abdomen; nausea with occasional vomiting; and loss of weight. She had been taking narcotics to get relief.

Previous history.—Diphtheria, 1892; scarlet fever, 1905; appendicectomy, 1916; influenza, 1918. The left breast had been removed on September 7, 1926, for carcinoma. She had had the upper right molar tooth extracted in September, 1931, to relieve pain in head, with no effect. She stated that her father died from cancer.

Examination.—Patient emaciated and apparently in great distress. Head.—A slight thickening felt on the vertex of the skull, quite painful on pressure. Neck.—Enlarged supra-clavicular glands. Chest.—The heart and lungs were negative. A mass of glands was present in the right and a few in the left axilla. Abdomen.—A large hard mass in the right hypochondrium, extending

halfway down to the crest of the ilium. The inguinal glands were enlarged.

The Wassermann test was negative. Blood count, red blood cells 3,640,000; white blood cells 5,200; hgb. 77 per cent. Urine negative.

A surgeon, the late Dr. J. E. Lehmann, who operated on this patient in 1926, removing the left breast, saw her in consultation. The diagnosis was carcinomatosis of the abdominal viscera with metastasis in the skull. No treatment was of any avail. She was left under medical care.

I placed her on a diet high in vitamin content and her condition seemed to become worse gradually. She developed jaundice and ascites. I considered that she did not have very long to live, and suggested that if she wished she could go home. She stated that she was feeling better, and if she went home she would like to continue her treatment, which she did. Her weight then was 98 pounds; red blood cells 2,860,000; white blood cells 6,000. I could see no change in her condition except for the worse. The only noticeable improvement was that she was now resting and sleeping without narcotics.

She was discharged from Winnipeg General Hospital January 23, 1932, and went to her home town hospital, where she remained one month, and then was taken home. A letter from her a month later stated that the jaundice and lumps had disappeared and that she was feeling better and had gained two pounds. She continued to improve and by May was doing all her own housework and able to walk three or four miles a day. I asked her to come to Winnipeg so that I could see her.

I saw her in May, 1932. Examination revealed none of the former findings except a small mass in the right upper abdomen. Her weight then was 121 pounds; red blood cells 4,000,000.

I examined her again October 14, 1932. Her weight was 122 pounds. I was unable to find any signs of her former condition. Red blood cells 4,750,000. I advised her to see Dr. Lehmann, and when he examined her he could find none of the former signs and told her she was in perfect health. She also visited Dr. P. Nimilowich, now practising in Winnipeg, who was my intern at the time she entered the hospital and much interested in her case.

Feeling she was cured, the patient discontinued her treatment and returned to her former mode of living on the farm. Then in the spring of 1933 the symptoms returned and she died in the fall of the same year. The cause of death on the certificate signed by the country doctor was cancer.

One thing which was neglected in this case was the taking of a biopsy on December 5, 1931. It was discussed at the time, but thought useless, considering the past history of the patient and clinical picture Also, it was not thought then that this patient would ever improve in health.

CASE 2

Mrs. E.J.P. (Winnipeg Gen. Hosp., No. 11707. Discharged March 14, 1930), a housewife, aged 54 years, called at my office on July 20, 1936. She was moving around with great difficulty with the aid of a cane, and complained of general pains, especially in the back and lower limbs. Weight 116 pounds.

Previous history.—She had had most children's diseases. Between the age of sixteen and seventeen she had lost about six months from work owing to some form of anæmia. The menses were always irregular, extending over from five to six weeks. Her mother had died from cancer of uterus, and the father from some form of growth in the bladder. She was married in 1907, and gave birth to a child in 1910, at the age of 28, after which the menses became more regular. Bronchitis appeared yearly. Diphtheria in 1915. She was troubled with eczema of hands quite frequently. The teeth had been removed and she was wearing plates. In the early part of 1930 a lump appeared in the left breast (biopsy, carcinoma). She had a course of x-ray treatment, then operation in March, 1930, followed by another year and a half of deep x-ray therapy. She enjoyed fair health for a year and a half, then began to have pains in different parts of the body, which gradually increased, especially in the back and lower limbs.

Examination.—Head.—A nodule on the vertex of skull. Slight paresis of right side of face, right orbicularis palpebrarum and frontalis muscle. Chest.—Heart and lungs negative. Abdomen.—Negative. Spine.—Tender on pressure, with deformity at the second and third lumbar vertebræ. The Wassermann test was negative; urine negative.

X-ray report (July 20, 1936).—Spine, antero-posterior and lateral films were made of the dorsal vertebræ. A general metastatic spread was seen in the upper six dorsal bodies; more marked in the third and sixth. Metastatic involvement was noted in the first and second lumbar, and there was some slight collapse of the third lumbar body. The third rib on the right side also showed involvement. Provisional diagnosis from the history and clinical findings, carcinomatosis; prognosis bad.

Under these conditions, and with the knowledge I had gained from my experimental work with mice, and also considering the behaviour of the symptoms of Case 1 under treatment, patient No. 2 was placed on a modified but somewhat similar line of treatment, *i.e.*, a diet high in vitamin content, supplemented with extra vitamins and dicalcium phosphate.

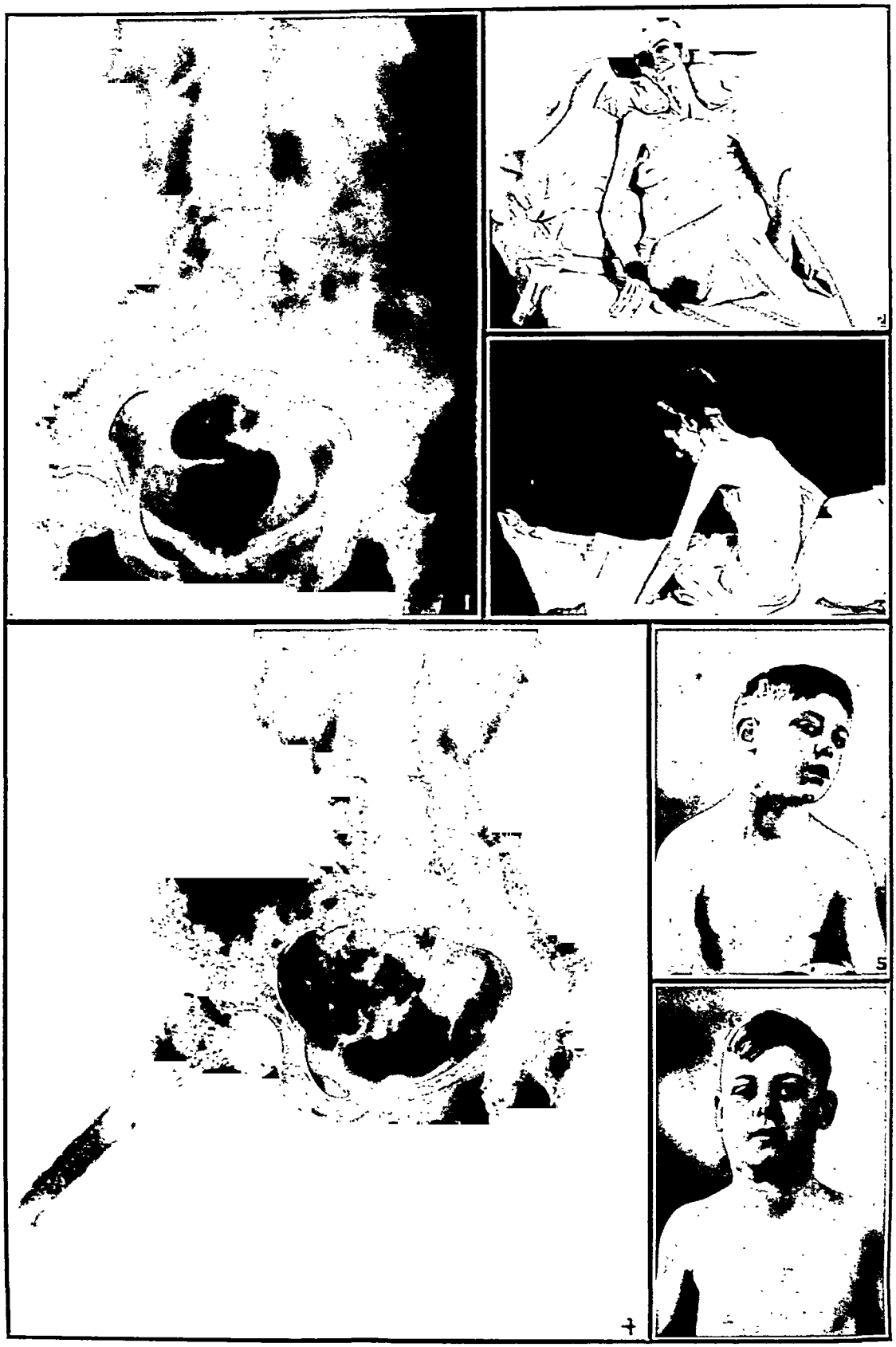
X-ray report of bones (March 29, 1937).—An antero-posterior film was made of the dorsal vertebræ and ribs. There appeared to be a carcinomatosis involving practically all of the vertebræ of the dorsal and lumbar spines. The process had extended and caused considerable destruction to the sacrum, both hip bones, and the upper end of the right femur. A decalcified area was seen in the vertex of the skull and parietal region. This appeared to be the same process (Fig. 1).

From July, 1936, until December, 1937, the patient's condition gradually became worse. There were paralysis of the right side of the face, loss of sight of the right eye, numerous hard nodules in the skin and subcutaneous tissue, a mass in the right axilla, and many nodular exostoses to be felt in most of the bones. There was also a partial collapse of the third lumbar vertebra. There was a hard enlargement at the junction of the upper and middle third of the right femur which was quite angry-looking. The patient being at home without institutional facilities, the leg was allowed to rest in the most comfortable position, with the result that a pathological fracture occurred, and the unbalanced muscular tension produced a marked deformity. Weight of the patient, 54 pounds (Figs. 2 and 3). A nodule was removed from the skin and subcutaneous tissue.

Pathological report.—A small tumour about 1.5 cm. in diameter. Microscopic examination shows large and small islands of spheroidal cells. Chromatism is not marked, indicating a not very aggressive process. Fibrosis is well marked. Diagnosis, spheroidal cell carcinoma, probably due to a secondary from the breast.

Report on April 15, 1938.—There is a little improvement in this patient's condition since December, 1937. She has a better appetite and looks forward to her meals. Weight 56 pounds. Blood count: red blood cells 3,690,000; white blood cells 10,250; hgb. 57 per cent. A few of the smaller skin nodules have disappeared. The angry appearance of the mass at the junction of the upper and middle third of the right femur has disappeared and the swelling is much reduced.

X-ray report of bones (April 16, 1938).—Antero-posterior and lateral films were made of the lower dorsal and lumbar vertebræ and pelvis. These bones show marked irregular decalcification and sclerosis. There are large decalcified areas in the iliac bones. This extra sclerosis is more marked in the bodies of the 12th dorsal and 1st and 2nd lumbar vertebræ. The 3rd lumbar body



is collapsed and shows some decalcification. The 4th and 5th lumbar appear normal. There is a pathological fracture of the right femur at the middle and upper third, with marked outward angulation (Fig. 4). The femur also shows irregular sclerosis and decalcification.

Although this patient is maimed and helpless through bone deformities of the disease she is bright and cheerful, and spends most of the day with needlework.

Throughout her illness the patient's suffering was relieved by an occasional Frosst tablet 222, or a sleeping sedative.

CASE 3

Master I.B.C. (St. Boniface Hosp., No. 96033. Discharged, February 17, 1937), aged 11 years, was referred to me by Dr. A. C. Abbott, and first consulted me February 15, 1937.

Previous history.—The cervical glands were noticed to be enlarged during the early part of 1935. Tonsillectomy, June 6, 1936. The glands continued to increase in size and number. One gland was removed in August, 1936; biopsy negative for malignancy. The glands still continued to increase in size and number, and another gland was removed February 8, 1937; biopsy, lymphosarcoma.

Examination.—A boy below average size for his age, but bright and fairly well nourished; weight 68 lbs.; height 53½ inches. Head and neck.—Enlarged submaxillary and cervical glands in the right side of the neck. Two scars were seen where glands had been removed. Chest.—Clinically, the lungs and heart were negative. An x-ray was taken to confirm this, which showed the lungs to be clear except for increased hilar thickening. Abdomen.—Negative. Blood count: red blood cells 4,180,000; white blood cells 7,200; hgb. 85 per cent.

This patient was placed on a diet high in vitamin content, supplemented with extra vitamins, February 15, 1937. Through the kindness of Dr. F. W. Jackson, Deputy Minister of Health, it was arranged that the municipality where the boy lived should pay for his drugs, as his people were on relief.

There was no noticeable change in his condition from February 15, 1937, until December 1, 1937, except that the glands continued to increase in size and number. After this date his general condition began to improve, the size and number of glands remaining stationary, and, with his weight increasing, he was allowed to attend school.

Report April 16, 1938.—It is now more than a year since this boy came under my care. Height 54¼ inches; weight 76 pounds. He has gained ¾ of an inch in height and 8 pounds in weight since beginning of treatment. Blood count: red blood cells 4,590,000; white blood cells 10,850; hgb. 86 per cent. There is no change in the size of the glands, but they are more freely movable.

It is just a question whether this boy is getting sufficient of his prescribed treatment as his parents are no longer on relief, and the municipality have discontinued their financial aid towards his medicine. At present he is recovering from mumps, and an injury to his right eye, received while playing at school. Fig. 5 is a picture of the patient on March 9, 1937; Fig 6, on April 16, 1938.

CASE 4

Mrs. J.W. (Winnpeg Gen. Hosp., No. 2501), a housewife, aged 61 years, consulted me on April 15, 1937, complaining of feeling tired, with fullness and heavy feeling in abdomen.

Previous history.—Nothing of any serious nature. Menopause, natural, 1925, accompanied by a few minor symptoms.

Examination.—Weight 169 pounds. Head and chest negative. Blood pressure 160/82. The patient did not wish to undergo a thorough examination and laboratory tests, and was given medical attention.

I next saw her on May 28, 1937. There was no improvement in her condition.

X-ray report.—Digestive tract negative. Gall bladder, examined by Graham's method, is visualized, but not as well as normal. No shadows seen which suggest calculi. Summary: there is some impairment of gall-bladder function.

I was called to see this patient on June 10, 1937. There was a slight show from the vagina and examination revealed an enlarged uterus. Dr. D. S. Mackay was called in consultation and recommended operation. The patient was admitted to the Winnipeg General Hospital on June 15, 1937. Total hysterectomy was done June 17, 1937.

Pathological report.—A large globular uterus, measuring 15 cm. in diameter. Projecting from the posterior wall is a large leiomyoma measuring 11 cm. in diameter. The cut surface shows marked degeneration. The uterine cavity contains blood and the endometrium is atrophic.

Microscopically, the leiomyoma has undergone sarcomatous change and shows extreme activity.

The urine negative except for a few pus cells.

The patient made a good recovery and was discharged from the hospital on July 5, 1937. She was placed on a diet high in vitamin content, supplemented with extra vitamins.

Report, March 25, 1938.—Weight 175 pounds; blood pressure 142/82; blood count: red blood cells, 5,120,000; white blood cells 14,150; hgb. 100 per cent. A voided specimen of urine was negative except for a few pus cells. She stated that she was enjoying better health now than she had for some years, and her life-long complaint, constipation, was very much improved.

CASE 5

Mr. W.M. (Winnipeg Gen. Hosp., No. 7027), a wholesale-house employee, aged 51 years. This patient was referred to me as a hopeless case by Dr. H. G. Grieve, and first consulted me on February 6, 1937. His general appearance was that of a weak, pale and quite ill man. Weight 116 pounds. He complained of severe pains in the head and occasional vomiting spells, sometimes associated with convulsive seizures. He was taking from twelve to fifteen Frosst 222 tablets a day to get relief.

Previous history.—Typhoid fever October, 1911; severe burns May, 1914; high blood pressure and lumbago, October, 1930. In June, 1935, he noticed a little deafness in right ear. He saw a specialist who discovered a horny growth in the naso-pharynx. A piece of growth removed was found to be suspicious for malignancy. In September, 1935, he had a piece of bone chiselled out of his nose. In October, 1935, he had fourteen deep x-ray therapy treatments. In January, 1936, he had a gland removed from neck (biopsy, epidermoid carcinoma, grade 3). In February, 1936, he had radium treatment, and about the end of February had twenty deep x-ray treatments. In September, 1936, he had an abscess in tissues of throat. In October, 1936, twenty deep x-ray treatments. In December, 1936, twenty deep x-ray treatments.

Examination.—Head.—Diplopia, numbness in right side of face, discharge from right nostril, with history of periodic hæmorrhages. Neck.—A few enlarged and hard cervical glands. Chest.—Negative. Abdomen.—Negative.

February 12, 1937.—Blood count: red blood cells 4,160,000; white blood cells 12,250; hgb. 65 per cent.

This patient was given a diet supplemented with extra vitamins. His general condition improved for a time, and he gained seven pounds in weight. Feeling better, he returned to his duties for a few days. Then vomiting and convulsions became worse, and the patient discontinued most of the treatment, thinking it might be the cause. He re-entered the Winnipeg General Hospital, October 21, 1937, and died there October 28, 1937.

CASE 6

Miss P.R. (St. Boniface Hosp., No. 97801), a factory employee, aged 24 years.

Previous history.—Whooping-cough in 1914; a mastoid operation in July, 1915; a second mastoid operation in January, 1916; measles, June, 1924; chickenpox, 1925; a sinus operation in June, 1930. Her stomach first troubled her in October, 1936.

The patient first consulted me on January 12, 1937, complaining of indigestion. Examination revealed typical symptoms of duodenal or pyloric ulcer. She was placed on the regular ulcer diet and treatment, which relieved her symptoms. She came to see me again on January 30, 1937. Her symptoms had re-appeared and were not relieved by carrying out the former method of treatment. An x-ray was suggested, but because of her financial means she preferred trying further medical treatment. I saw her again on March 30, 1937, and she had received no relief. A gastric analysis was made (free hydrochloric acid 24; total acid 48. At this time a mass was felt in the right hypochondrium. An x-ray was done at the Outdoor Department of the Winnipeg General Hospital.

March 8, 1937 (barium series).—Stomach.—There was a definite filling defect in the pyloric end of the stomach. Duodenum.—We were unable to fill the duodenal cap. Five hours.—There was a 20 per cent gastric residue, and the head of the meal was in the cæcum. Twenty-four hours.—The meal was throughout the large bowel. Summary.—There appeared to be a definite lesion at the pyloric end of the stomach, causing partial obstruction. We asked to re-examine this patient after a week or ten days on ulcer regimen.

March 23, 1937 (stomach check-up plate).—At once. —There was still a large filling defect in the pyloric portion of the stomach, which showed very little change since the last examination. The duodenal cap was normal. Five hours.—There was still a small gastric residue. Summary.—Ordinarily, one would consider this lesion to be carcinoma, but when the patient's age is considered it could be due to a large inflammatory mass in this region, associated with pre-pyloric ulcer.

This patient was admitted to the public ward of St. Boniface Hospital on March 30, 1937, and was operated on on April 3, 1937. A large carcinomatous mass was found to involve the pyloric end of the stomach. There were many glands in the mesentery, although not wide-spread. One-half of the stomach was removed, together with one inch of the duodenum. Biopsy, adeno-carcinoma, both in the stomach and in the glands. The patient was discharged from hospital on April 17, 1937, weighing 98 pounds. She was placed on a diet high in vitamin content, supplemented with extra vitamins, and did well for about three and a half months, gaining 10 pounds. Then stenosis appeared at the seat of operation and all food was rejected. The patient returned to St. Boniface Hospital on August 4, 1937, and died a few weeks later.

REMARKS

The histories of these few cases show the different types of malignancy, the duration of the disease, and the treatment each had received before being placed on this new line of treatment. To comment in detail on the treatment these patients received would be cumbersome, and probably more confusing than enlightening, as the treatment varied somewhat in each case, depending on the location and severity of the disease and the ability of the patient to co-operate.

A common factor in all the cases was a diet high in vitamin content, supplemented with extra vitamins. To ascertain *which* vitamin, or vitamins, correspond with, and are necessary to support, the different disturbed metabolic functions, will require further study, with patients under more strict observation than can be given in a general medical practice.

However, the response made by the patients able to cooperate in this treatment, their improvement in health, with their suffering reduced and life prolonged, lends support to the research recently carried out with mice which attempted to prove that the *control* of cancer is not to be found in *treatment* of the disease, but in *prevention*. Once the disease is well established the future prognosis of the patient becomes uncertain. Whether he succumbs or improves in health while under treatment, he will have experienced a long illness. If he should improve in health, he may be left an invalid through damage of some vital part, as in Case 2.

This work is being published as it presents, I believe, a means of *controlling* cancer through *prevention*.

My thanks are again due to Dr. Sara Meltzer, Assistant Pathologist of the Winnipeg General Hospital, for carrying out the histological examination of the growths and the pathological work with mice; the College of Physicians and Surgeons of Manitoba for continuing the grant of the Gordon Bell Memorial Bursary for the present year; Mr. W. G. Bower, representative of Ayerst, McKenna & Harrison, for cod liver oil.

My thanks are also due to the following for their assistance: Dr. Digby Wheeler, x-ray work; Abbott Clinic, laboratory work; Mr. Wm. Gould, photographic work; Miss J. B. Gee, technical work.

REFERENCE

1. DAVIDSON, J. R.: An attempt to inhibit the development of tar-carcinoma in mice. *Canad. M. Ass. J.*, 1934, 31: 486; 1935, 32: 364; 1937, 37: 434.

THE MENOPAUSE AND ITS MANAGEMENT.—Emil Novak declares that a distinction must be drawn between the treatment of menopausal symptoms and the management of the woman passing through the menopause. The vasomotor group of symptoms are the only ones which seem clearly attributable to the hormonal readjustment of the menopause, though it is possible that others may at times be directly produced. However, the menopausal woman may present many other manifestations only indirectly of menopausal significance, and yet often constituting real problems in treatment, which must be along psychic and general rather than endocrine lines. Only a minority of menopausal women need medical treatment, and a much smaller proportion require organotherapy. While the mechanism of the vasomotor menopausal symptoms is not clear, the immediate factor is quite certainly the cessation of ovarian function, and ovarian therapy with the now available effective preparations of œstrogens is a rational procedure. The results are variable, rarely brilliant, but often satisfactory to both patient and physician. Light irradiation of the hypophysis may be tried if organotherapy is unsuccessful, but its too promiscuous use should be decried.—*J. Am. M. Ass.*, 1938, **110**: 619.

FRACTURE OF THE MAXILLARY ZYGOMATIC COMPOUND*

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AN interesting group of face injuries occurs about the cheek bone. Direct violence produces a variety of fracture patterns involving the inferior and lateral orbital margins, the malar prominence and the zygomatic arch. These structures constitute well-defined features and any depression or elevation results in unsightly deformity. Treatment varies from a simple interlocking of the deformed parts into a correct position to a more complex method of elevation and retention of the displaced fragments.

The maxillary zygomatic compound is that part of the skull making up the malar prominence or cheek bone and contributing to the inferior and lateral margins of the orbit. It is composed of part of the maxilla and the whole of the zygomatic bone (Fig. 1), and takes part in the maxillary zygomatic compound 6, superior maxilla 7, mandible 17, and nasal bones 40.

The line of fracture is characteristically constant and complex (Fig. 2). It runs along the floor of the orbit, across the infraorbital ridge, down the facial wall of the antrum, curving laterally above the mouth and dental arch to gain the posterior wall of the antrum in the infratemporal fossa. It may even reach the inferior orbital fissure. At any rate, the fracture line passes upwards and forwards on the lateral wall of the orbit, cutting the lateral orbital margin usually in the region of the zygomatico-frontal suture. A vertical fracture through the zygomatic arch completes the injury. This whole mass, the malar prominence, comprising parts of the antrum and orbit, is

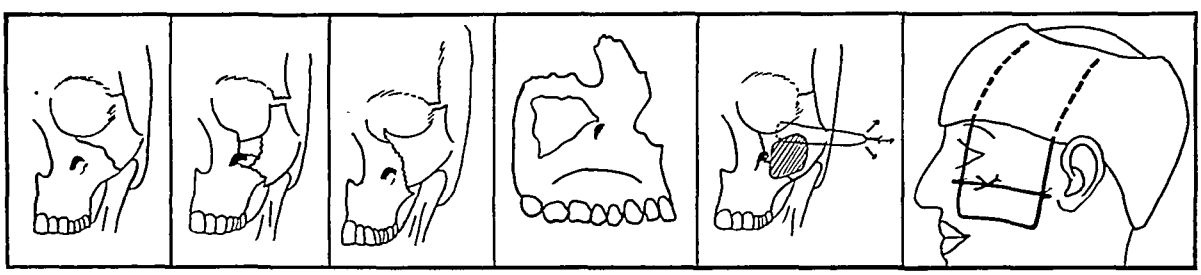


Fig. 1 Fig. 2 Fig. 3 Fig. 4 Fig. 5 Fig. 6

Fig. 1.—The malar zygomatic compound or "cheek bone" forms part of the maxillary antrum and orbit and gives skeleton to the inferior and lateral orbital margins and the malar prominence. **Fig. 2.**—Blows on the malar prominence produce a complex fracture with comminution, impaction and deformity. If the blow is downward, the impaction is toward the antrum. **Fig. 3.**—If the blow is upward, impaction is toward the orbit. **Fig. 4.**—The incision for open reduction of the fracture. Most of the facial wall of the antrum may be easily exposed. **Fig. 5.**—Indicating the amount of bone removed from the facial wall of the antrum and placing of the stainless steel wire loop for traction or fixation. **Fig. 6.**—The plaster of Paris headgear with incorporated wire posts providing a base from which traction or fixation may be applied to the depressed malar fragments. The horizontal bar may be adjusted up or down and the stainless steel wire loop forward or backward thus providing fixation in any desired direction.

formation of the orbit and maxillary antrum. Being a prominence, it is exposed to direct violence, but less so than are the other facial bones. It is of comparatively sturdy structure and requires severe trauma to damage it. Rarely is the fist sufficient, and more severe injuries, as from automobile accidents, falls from a height, and blows from heavy weapons contribute the majority of cases. Its frequence of fracture is in about the following proportions:

broken loose and rotated either towards the antrum (Fig. 2) or the orbit (Fig. 3), and the fragments suffer more or less impaction into one or both of these structures. Considerable comminution or fragmentation of the facial wall of the antrum and floor of the orbit is usually present, and not infrequently the infraorbital margin is split into two or three fragments. The orbital tissues suffer injury and there is hæmorrhage into the conjunctiva and sclera. The antral mucosa is torn and the antrum contains blood clot.

* From the Montreal General and Saint Mary's Hospitals.

Certain features render this type of fracture evident on careful clinical examination: (1) Irregularity of the infraorbital margin is characteristic and a simultaneous palpation of both infraorbital ridges for comparison is a most conclusive diagnostic move. The deformity is evident and swelling rarely sufficient to obscure the fracture. (2) Flattening of the malar prominence is significant but swelling may early obscure this sign. (3) Swelling and palpebral ecchymosis are misleading, and patients are seen in whom the eyes are black and there is sufficient swelling to indicate fracture of every bone in relation to the zygomatic pyramid, and yet clinical examination and roentgenograms will reveal no injury to the bone. On the other hand, the case in Figs. 7 and 8 shows little swelling and yet underlying is severe injury of the bone with depression. (4) Chemosis of the conjunctiva and sclera are present and should lead one to suspect injury of the orbital floor and margins. (5) Bleeding from the nose is an interesting point in that there is a lapse of time, a minute or so, from the occurrence of the injury until the nose starts to bleed. This is the time required to fill the antrum to its ostium before the blood spills over into the nose. (6) Surgical emphysema of the orbital and buccal tissues may be present, and is due to the patient blowing the nose and forcing air through the fractured antral walls. (7) Crepitus may be elicited by deep palpation along the infraorbital margin, or, if this is painful, by heavy pressure on the lateral orbital margin. (8) Palpation high in the mouth above and lateral to the last molar tooth will reveal an irregularity of the malar bone where it arches upwards towards the zygomatic prominence. Not infrequently this part of the mouth is tender to palpation. (9) Infraorbital anæsthesia giving numbness of the cheek, upper lip and side of the nose, or molar anæsthesia, occasionally occurs if the fracture line has involved the infraorbital nerve and foramen or the posterior superior alveolar nerves as they course down the facial or posterior walls of the antrum to the molar teeth.

Roentgenograms are a great help in confirming the diagnosis and determining the extent of injury. Preferable are stereoscopic films taken anteroposteriorly in the occipito-frontal position.



Fig. 7



Fig. 8



Fig. 9

Fig. 7.—Severe, impacted fracture of the left maxillary zygomatic compound resulting from a fall. The soft tissues show little swelling yet the zygomatic pyramid is impacted towards the orbit with marked comminution of the facial and orbital walls of the antrum (see Fig. 8). **Fig. 8.**—Occipitofrontal roentgenogram showing impacted fracture of the left maxillary zygomatic compound. Note the cloudy antrum and the fracture lines through the inferior and lateral orbital margins. Clinically the spicule seen on the inferior orbital margin was well up toward the inner canthus. **Fig. 9.**—Illustrating the traction apparatus and headgear in position.

The usual sinus views taken in the occipito-frontal (Fig. 8) and the occipito-mental positions, as described by Graham Hodgson are satisfactory.[1] The presence of an injury can usually be determined from well-detailed antero-posterior films as taken for the diagnosis of skull injuries. Lateral views are of little help. The involved sinus is dark because of contained blood clot, and a little careful study of the films will reveal irregularities of the bony landmarks.

No excuse need be offered for vigorous and effective treatment. Depressions of the infra-orbital margin and malar prominence are deforming, not to mention the possibility of orbital and sinus complications which may ensue. If left untreated prolonged plastic procedures may later become necessary, such as those designed for ectropion of the lower lid and costal cartilage grafting to restore a depressed infraorbital margin.

Textbook advice to pack the antrum fills one with a foreboding of complications in a structure that tolerates packing so poorly. The surgical efficiency of such a procedure might also be questioned. In the cases under discussion packing was not found necessary in the easier, more recent cases, and was avoided in the more difficult ones by a procedure of direct wiring.

These fractures are satisfactorily handled by a modified Caldwell-Luc operation, which permits an open reduction of the deformed parts with the finger, the removal of spicules of bone from the orbital and facial walls of the antrum, and a sound treatment of the sinus injury, all in one and the same operation performed through the mouth. A curved incision with belly upwards is made across the canine fossa well up toward the gingivobuccal reflection and extending from the lateral incisor or canine region back to the second molar (Fig. 4). The mucoperiosteum is elevated from the facial wall of the antrum, watch being kept for the infraorbital nerve and foramen. The lowest line of fracture is encountered and is usually lateral to but may pass through the foramen. Comminution of bone is the rule. Useless fragments are removed and a hole punched out sufficiently large to admit the finger comfortably (Fig. 5). This permits inspection of the antrum which contains blood clot in various stages of disintegration or suppuration. The orbital and posterior walls of the antrum may be examined and palpated, the whole of the zygomatic pyramid and infraorbital margin manipulated and the extent of the damage ascertained. The bone of the orbital floor is found in varying degrees of comminution. The infraorbital margin is sometimes in two or three pieces, or may, with the zygomatic bone make up one large fragment. If the fracture is very recent, comminution not too extensive, and the overlying soft tissues have not had sufficient time to organize in a depressed position the fragments may be elevated easily and will interlock one against the other, reforming the normal arch of the infraorbital margin. If this fortunate state of affairs obtain no further treatment is necessary than to complete the Caldwell-Luc operation, that is, to make an opening through the medial wall of the antrum into the inferior meatus of the nose to provide drainage for the damaged antrum. The canine fossa incision is closed completely with interrupted sutures.

Frequently comminution is such that the parts will not interlock and remain in an elevated position, or the soft tissues may have so organized that a satisfactory elevation cannot be obtained. These patients have usually been on the borderline of cranial injury, and observation for several days on the neurosurgical ward has been necessary while the more serious question of intracranial injury was being considered. Then, again, the nature of the zygomatic injury may not have become apparent until swelling had subsided. At all events, if the treatment has been delayed healing of the soft tissues hampers elevation and reduction. It is for this delayed or comminuted type of case that a method of direct traction, elastic or wire, passing from the bone to a plaster of Paris headgear, has been found most helpful.

A fine stainless steel wire is carried on a curved needle into the orbit just above the infraorbital margin down through the fracture line or comminution of the orbital floor into the antrum and retrieved through the mouth opening. The wire is reinserted back through the cheek so that it makes its exit on the face a centimetre or two below its entrance. In this way a wire loop is passed around one of the larger and more important infraorbital fragments (Fig. 5). The opening into the nose is made and the mouth incision sutured as described above. All that remains is to provide a base to which the wire loop may be attached for the purpose of fixation or traction.

A plaster of Paris headcap is made, much after the method of Scogin,[2] briefly as follows. About a foot of 3 inch stockinette is cut and carried down over the patient's head to extend two or three inches below the eyebrows. Four pads of orthopædic felt or splint padding are placed vertically over the stockinette at the four quadrants of the head. A plaster bandage of 4 inch width is wrapped about the head over stockinette and padding, extending across the forehead, back above the ears, and well down over the occiput, over which it is spread out in a broad area. A second bandage is wrapped in a similar fashion. A piece of coat-hanger wire is bent into a long "U-shape" (Fig. 9). The upper bars of the "U" are shaped to conform to the vertex and be incorporated in the plaster

headgear so that the horizontal bar comes to rest about an inch below the loop of stainless steel wire. The vertical bars are passed through the stockinette and incorporated snugly in the headgear with two additional plaster bandages. The free ends of the stockinette are folded from below up and from above down over the wet plaster, providing a neat, firm headgear with binding posts to provide traction. A straight piece of wire is then cut and wired across the base of the "U" at about the level of the stainless steel wire loop. This horizontal piece provides a bar, adjustable up or down, from which traction may be applied in any direction.

If reduction of the fragments has been complete the stainless steel loop is merely wired to the horizontal bar in the desired position. If reduction has not been complete a rubber band or rubber ligature may be passed from the horizontal bar to the wire loop, providing elastic traction which will in 24 to 48 hours complete the reduction, much as do the weights in a leg fracture or the elastics in a jaw fracture. When reduction is complete the elastic is replaced by wire.

The headgear gives little or no discomfort. The retention apparatus is kept in position from two to three weeks, at which time soft tissue healing and callus formation should be sufficient to prevent a recurrence of displacement should the patient roll on the part during sleep. The headgear at the end of treatment may in some cases be slipped off easily and in others will have to be cut along the line of one of the felt pads. The stainless steel wire is easily removed by cutting the lower strand flush with the skin and drawing it out by the upper strand through the orbit. There is less likelihood of causing a recurrence of the displacement by removal in this direction.

No post-operative complications were encountered in any of the cases treated in this manner. Temperatures were normal after the first 24 to 48 hours, and the patients ambulatory during the rest of their treatment.

CONCLUSIONS

1. Fracture of the maxillary zygomatic compound is a clinical entity causing facial deformity and injury to the orbit and maxillary antrum.
2. It is diagnosed by characteristic features and the help of roentgenograms.
3. The fracture is efficiently handled by a modified Caldwell-Luc operation.
4. In early cases the fragments can usually be elevated and interlocked into a correct position.
5. In delayed and badly comminuted cases a method of elevation and retention is necessary.
6. Such a method is described, providing for the fixation of the fragments to a plaster of Paris headgear.

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INDICATIONS FOR THE OPERATION OF PULMONARY LOBECTOMY*

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WHEN honoured with an invitation to read a paper on the subject of pulmonary lobectomy before this combined meeting of the Canadian and Ontario Medical Associations, I at first hesitated to do so because our series of cases is comparatively small. Further reflection convinced me, however, that there was much to be learned from a careful analysis of this group, perhaps, particularly, from the deaths that occurred.

A rather sharp division of opinion among thoracic surgeons still exists as to the merits of the one- and the two-stage lobectomy. The cases in this group were, with two exceptions, operated upon in one stage. In one of these so much time was required to free the lobe that it was thought unwise to complete the operation, and in the other the sputum escaping into the

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From the Department of Surgery of the University of Toronto and the Toronto General Hospital. Based on the work of the author and his senior colleague, Dr. N. S. Shenstone.

bronchial tree was so great in amount and so tenacious that it was difficult to maintain a free air-way. The technique has been essentially that described in the *Canadian Medical Association Journal* of August, 1932,[1] and in the *British Journal of Surgery* of August, 1933.[2] The most important single addition to that technique we believe to have been the institution of prolonged continuous postural drainage on an inclined plane. This method of drainage was begun by the staff of the Hospital for Sick Children, Toronto, in 1930. The various positions necessary for adequate drainage of different portions of the bronchial tree were described by the late H. P. Nelson[3] in 1934. They should be used as a pre-operative measure in all those cases that have a considerable amount of sputum. By this means it has been possible to greatly reduce the volume of sputum and frequently to render it less foul and tenacious. Febrile cases tend to become afebrile. It would appear to be in part responsible for the fact that since 1933 no case of post-operative bronchopneumonia has occurred. Pre-operative phreniclasia is no longer carried out, since we have come to believe that a moving diaphragm is an important factor in promoting re-expansion of the remaining lung. In this we have followed the lead of the Brompton Hospital group. The second tourniquet is no longer used; instead, as each dilated bronchus is exposed in the course of amputation of the lung it is grasped with two pairs of strong forceps and divided between them. In addition to preventing more effectively the escape of infective material this technique makes it impossible for the pedicle to slip out of the tourniquet, as occurred in one case with death from hæmorrhage. As a rule, also, the closed pedicle is no longer sutured to the surface of the adjacent lobe because of the danger of a localized abscess occurring about the stump, and because we no longer believe it to be so important in the prevention of a bronchial fistula, or, indeed, that the occurrence of a fistula is a serious complication. Spinal anæsthesia is still used in the majority of cases.

Bronchiectasis.—The operation of pulmonary lobectomy is indicated most frequently for the cure of bronchiectasis, and for this disease we have performed it upon 37 patients. Exact indications for the operation are difficult to enunciate until there exists a more complete knowledge of the life history of patients who suffer from the disease in its various stages. That those who suffer from repeated febrile attacks, those who have considerable hæmoptysis, those whose sputum is so copious or so foul as to render them unfit for ordinary social relationships, and those who suffer from marked general debility should be operated upon whenever the disease is of such an anatomical distribution as to permit of its complete or nearly complete removal is undoubted. There is much more room for difference of opinion in those relatively early cases in which the disease is comparatively mild and which do not present these special indications. There is great need for an accurate follow-up over a period of years of groups of cases when the extent of the disease has been determined accurately by lipiodol injection and it has not been thought wise to advise operation or it has been refused. The reports of Findlay and Graham[4] and of Roles and Todd[5] are the only ones with which I am familiar that have been done under these conditions, and they both suggest very strongly that the disease is a progressive one in a large proportion of cases and that spontaneous recovery of established disease is not to be expected. Anyone connected with a large chest service is aware of the considerable mortality that occurs among untreated cases as a result of pneumonia with its various complications, but what proportion of the total number suffering from the disease these represent it is at present impossible to say. More information is also needed as to the degree of physical disability occasioned by the disease and the extent to which those who suffer from it are able to engage in gainful occupations.

A review of the roentgenograms made following lipiodol injections in our cases has convinced me of the inadequacy of many of the early ones. A complete mapping of the whole of the bronchial tree of both lungs should be insisted upon. The injections obtained by the ordinary supraglottic method are usually sufficient for a diagnosis, but rarely good enough for a satisfactory anatomical localization of the disease. In adults the injections through the cricothyroid membrane or through a catheter in the larynx are much more satisfactory. As it is obviously impossible to introduce lipiodol

into bronchi already filled with secretion, all cases should be subjected to postural drainage before the injection is undertaken, and if the sputum is copious and thick this should be continuous over a period of one to two weeks. Those cases in which the injection is still inadequate, and probably all children, should be injected through a bronchoscope. Our experience would lead us to believe that a cure of the disease depends entirely upon a complete removal of all involved bronchi. We have not seen a progression of the disease following lobectomy in those cases in which a satisfactory operation was done. A review of the original x-ray films and further lipiodol injections have convinced us that in those cases not cured by operation the disease was more extensive than was originally thought. Post-mortem examination of some of the fatal cases showed widespread disease, and we now recognize that lipiodol injections in these were inadequate and should have been repeated before operation was advised. Of the 38* patients operated on 10 died as a result of the operation, a mortality of 26.3 per cent. Four of the patients had two individual lobectomies and one had three so that 44 lobectomies were actually performed with 10 deaths, an operative mortality of 22.7 per cent.

Twenty of the 37 patients had disease which definitely dated from childhood. In many, but not all, there was a definite history of an acute chest infection, presumably pneumonia. The pneumonia had in some instances complicated one of the exanthemata, in others it had not. It is interesting that in some of these cases the symptoms of the disease had been present for as long as 20 years, and yet the lesion was sufficiently localized to permit of the total removal of the involved area of lung. Of the 4 patients in this group who died and were subsequently found to have had very extensive lesions such that no operation should have been attempted, the disease had been present for periods of 11 years, 12 years, 16 years and 21 years.

In 6 cases the disease began in later life following a definite attack of pneumonia. The earliest onset in this group was at 16 years, the next at 20 years, and the oldest patient was perfectly well until 50 years of age. Their ages at the time of operation varied from 23 years to 52 years. In 7 cases the disease began insidiously without any preceding acute chest infection. In 6 there was an unexplained onset of cough and sputum and increasing ill-health; in the 7th the onset was at 42 years of age with cough, recurrent hæmoptysis, and progressive asthenia, without any appreciable amount of sputum. One case began at 51 years of age following an excision of the mandible. Collapse of the lower lobe occurred post-operatively. The

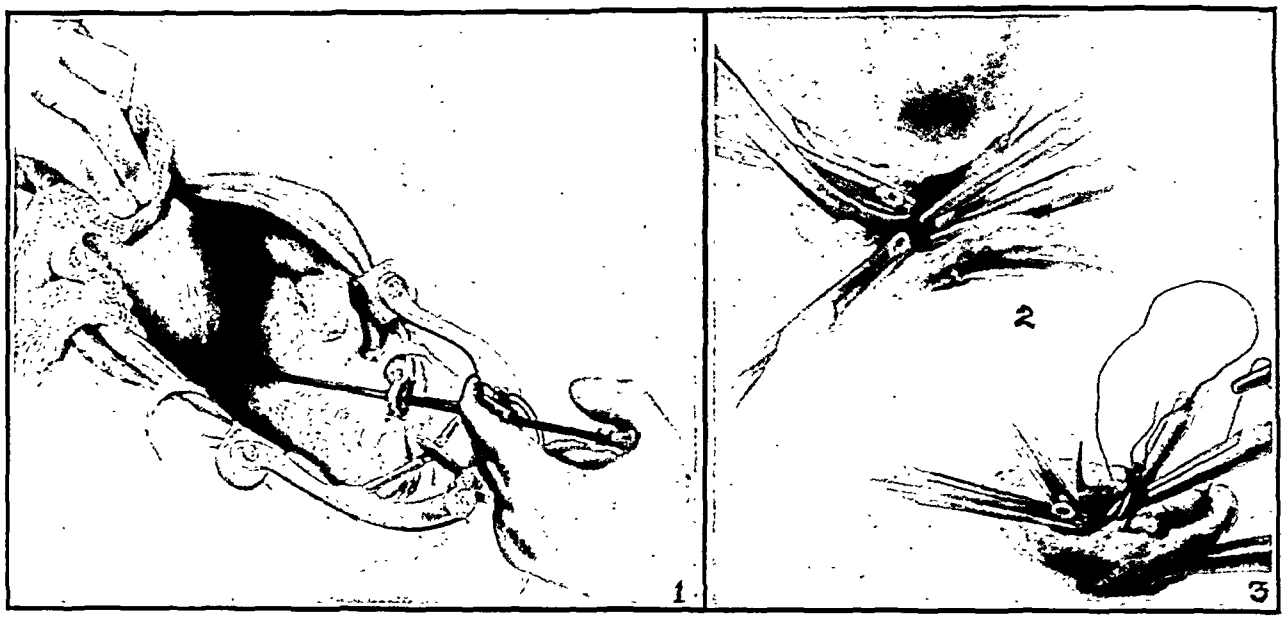


Fig. 1.—One tourniquet applied instead of two as in original technique. Fig. 2.—Semi-diagrammatic representation of the manner in which escape of secretions is prevented by dividing the bronchi between forceps. Fig. 3.—Demonstration of somewhat deeper cuff turned down to permit easier closure of the pedicle.

* One patient had two lobectomies one and a half years apart and is listed as two cases.

collapsed area failed to expand and subsequently became the seat of an extensive bronchiectasis. One case resulted from a large piece of beef bone becoming lodged in the right lower lobe bronchus and involved the right lower and middle lobes. Two cases followed gun-shot wounds of the chest, and in both of these the original lesion was probably an abscess. In one of them a sequestrum derived from the overlying rib was still present at the time of operation.

This survey, therefore, illustrates rather well the varied methods of onset. Approximately 54 per cent dated from childhood, 16 per cent followed a definite pneumonia in adult life, 7 cases had an insidious onset, 1 followed a post-operative massive collapse, 1 a foreign body in the bronchus, and 2 wounds of the lung. From a pathological standpoint the type of change was essentially similar in all cases, and although the extent of the cellular infiltration varied somewhat with the acuteness of the disease at the time of operation there was nothing to suggest that the pathology was not the same in all cases.

Of the 28 patients who survived operation only one could be said to have had little disability, and she had had several attacks diagnosed by her physician as bronchopneumonia during the previous winter. Of this group 16 may be regarded as cured and need not be considered further. Eight are stated to be improved. These will, I think, warrant further consideration. Four of them might justifiably be regarded as cured, in that they have one drachm or less of sputum daily and are in excellent health. One case was technically difficult because of the density of the pleural adhesions, and although it was known that the middle lobe was also involved it was thought unwise to remove it at that time. It has been removed at a second operation and although it is too recent to say definitely, it would seem probable that the man will be cured. Two patients had imperfect lipiodol injections, one because she appeared relatively early in our experience, and one a foreigner who spoke no English and was difficult to handle because of a peculiar mental reaction which we at the time attributed to his inability to understand. The first of these was much improved but was found later to have extensive disease of the upper lobe on the same side. She died while this was being removed a year and a half later, and her name appears again among the fatal cases. The second was greatly improved in general health, but the sputum was only slightly decreased in amount and further lipiodol injection demonstrated disease of the upper lobe on the same side. This was successfully removed a few weeks ago. The chest condition is satisfactory but he has developed symptoms which lead us to believe that he is suffering from a brain abscess. There are no localizing symptoms, and a review of his case has led us to think that his uncooperative attitude when first seen was due to the fact that he already had a cerebral lesion and not to his nationality.* One patient developed a massive collapse of the lower lobe on the opposite side, in which there is now bronchiectasis, following operation. This was thought to be an acute lesion, but a review of the plates at this time shows that the lipiodol injection was unsatisfactory but that in spite of a poor injection, disease on the other side should have been recognized before operation.

All the unimproved cases showed much more disease. Three occurred early in the series when less complete outlining of the bronchi was insisted upon. One was operated upon less than one year ago. There were clinical signs in the chest of quite a widespread character, and lipiodol showed some dilatation of the bronchi in the opposite lower lobe and of the upper lobe on the same side. The dilatation was rather a general increase in calibre of the bronchial tree than a true bronchiectasis, and it was hoped that a removal of the most diseased area might result in an alleviation of symptoms and perhaps stay the progress of the disease. A massive collapse of the upper lobe on the same side occurred post-operatively, and she is no better and may perhaps be worse. Cases of this kind, in which râles are present over a widespread area, should be regarded as unsuitable for operation even though the lipiodol injection suggests a localized disease.

Of the 28 surviving patients, therefore, 16, or 57 per cent, were definitely cured; 8, or 29 per cent, were improved; and 4, or 14 per cent, were unimproved. Probably a fairer picture would be presented if 4 of the improved patients were

* Since this was written the cerebral condition has been recovered from. No definite diagnosis was made.

regarded as cured, in which case the figure would be cured 72 per cent, improved 14 per cent, and unimproved 14 per cent.

Two cases are worthy of special mention. The first, an infant of 21 months, weighing 15 lbs., had disease of the upper lobe of 15 months' standing. It followed pneumonia at 6 months of age. The sputum was copious, thick and foul: it was mostly swallowed so that the quantity could not be estimated. She made a satisfactory recovery following a one-stage lobectomy and is now a healthy child of normal weight and appearance, free from cough and sputum. The other, a girl of 21 years, had bronchiectasis of the lower lobe on the left side and the lower and middle on the right side. All three diseased lobes have been removed at separate sittings. She is now well and does not seem particularly embarrassed by the loss of three of the five lobes of her lungs.

Of the 10 patients who died 6 had localized disease, and from this point of view were suitable for operation. One died of bronchopneumonia. No pre-operative postural drainage was carried out and phreniclasia was done before operation. If he had been prepared as we now believe proper the mortality might have been avoided. One had had pneumothorax for so long that the upper lobe was tied down by a thick visceral pleura and expansion of this lobe rendered impossible. As a result of this a persistent empyema cavity occurred. Death was due to bronchopneumonia that developed following a thoracoplasty done three and a half months after the lobectomy. We now believe that in such cases the lung should be allowed to expand before lobectomy is undertaken. Such pneumothorax treatment is, of course, always unwise in cases suitable for lobectomy, as it offers no hope of cure and materially increases the difficulty and danger of lobectomy, since expansion of the lung is always followed by the development of dense pleural adhesions, and, should expansion not occur and lobectomy be undertaken, a persistent empyema is inevitable. One died 8 months after the lobectomy from secondary hæmorrhage from an intercostal artery, a plastic operation on the chest wall having been undertaken to close a persistent empyema cavity. This patient had copious quantities of very foul sputum, and one now feels that a proper pre-operative preparation was not carried out and that if it had been the particularly severe and foul infection which resulted in a large bronchial fistula might have been avoided.

One died of a brain abscess which at autopsy was found to present such evidence of chronicity that the pathologists felt that it had probably been present before operation. Whether or not this was true is impossible to say as the abscess was silent. At any rate, one knows of no means by which such a fatality might have been avoided. One was a difficult case who had had a chronic empyema over many years and had multiple broncho-cutaneous fistulæ communicating with an underlying bronchiectatic lobe. A convulsive seizure occurred on the operating table while the overlying re-formed ribs were being removed. This seizure seemed to be recovered from and the operation was proceeded with. He failed to recover consciousness and showed signs of cerebral irritation up to the time of death, some 30 hours later. As no autopsy was obtained the diagnosis of cerebral air embolism is presumptive only. One seemed an ideal case for operation. Some accident occurred when the lobe was being amputated. The heart stopped, was re-started by cardiac massage, stopped once more and then settled down to a normal beat after intracardiac injection of mm. xv of adrenalin. The operation, which was very easy, was completed rapidly and the patient returned to the ward. He failed to recover consciousness, and four hours later had a series of six epileptiform seizures. He remained unconscious with evidence of cerebral irritation up to the time of death on the fourth day. As no autopsy was obtained the cause of death was undetermined. Spinal anæsthesia was used, but since nothing untoward happened during the first fifteen minutes it would seem unlikely that death was related to the anæsthetic.

Of the four remaining deaths one occurred in a girl whose lipiodol plates were unsatisfactory, and who was regarded as having marked disease of the left lower lobe and a small amount of disease in the lower part of the left upper. She made a good recovery following removal of the lower lobe and the lingual process of the left upper, and was markedly improved, but never became quite sputum-free and developed hæmoptysis. A further adequate injection now showed an extensive dilatation of the bronchi of the left upper lobe, and re-examination of

the previous plates showed that this disease was present before the original operation. Removal of the upper lobe was undertaken one and a half years after the original operation. All went well until the tourniquet was loosened, when the bronchial tree filled with blood and she drowned in her own blood before anything could be done. Such an accident should not, of course, have occurred, and with the change in technique which we have adopted as a result of this experience is unlikely, one hopes, to be repeated.

The three remaining patients all suffered from advanced disease. The lipiodol injections were hopelessly inadequate from one's present point of view and none of them should have been operated on. All died from widespread pulmonary suppuration, and at autopsy were found to have bronchiectasis of the upper lobe on the same side and the lower lobe on the opposite side. All of these cases occurred relatively early in our experience and today operation would not be considered in any of them.

A review of these ten deaths reveals the fact that three occurred in patients totally unsuited for operation; two probably can be attributed to improper or insufficient preparation for operation; one occurred in a patient who because of a long-standing pneumothorax should not have been operated on at that time; one occurred from hæmorrhage from the stump, and was almost certainly avoidable. The remaining three must, in the light of our present knowledge, be regarded as unavoidable.

Lung abscess.—Lobectomy has been performed for chronic lung abscess of the lower lobe on one occasion only. This was a relatively small abscess of two years' standing. The only sign was recurring massive hæmoptysis. Recovery was uneventful. This abscess would have been extremely difficult to treat by surgical drainage. Lobectomy would seem to be the ideal method of treatment for certain types of rather deeply seated abscesses, because it is easier and safer than drainage, and because the secondary bronchiectasis almost invariably present makes a complete cure by any other method impossible.

The upper lobe has been removed for the multilocular type of abscess involving the greater portion of the lobe on four occasions. Two were of some months' standing and two of much shorter duration. The former were densely adherent and technically extremely difficult to handle. In all four cases the abscesses were opened in the process of freeing the lobe, with consequent gross contamination of the pleura. All these patients died. These cases were of the type that is nearly always fatal, regardless of the method of treatment employed; such cases should be treated by thoracoplasty and not by lobectomy.

Tuberculosis.—Lobectomy has been performed for the cure of tuberculous abscess once only. Unfortunately, a rather acute staphylococcus infection occurred with the formation of a localized empyema. This patient at present has only a small sinus in the chest wall, and it would appear that this is going to close spontaneously. She is in excellent health, has had no recrudescence of the disease elsewhere in the lung, and will, one feels, be relieved of the disease without the chest deformity that would have followed thoracoplasty, and with better respiratory function. In such localized tuberculous abscesses in the lower lobe lobectomy would seem to have a place. They are difficult to close, when pneumothorax is impossible and diaphragmatic paralysis has failed, by anything less than a complete thoracoplasty.*

One patient with tuberculous bronchiectasis of the upper lobe was subjected to lobectomy. He had had disease of seven years' standing, most of which time he had spent in a sanatorium. He suffered from recurrent hæmoptysis which kept him in chronic invalidism. The chest was opened in this case through an anterior-flap approach. The exposure was satisfactory. The patient did well for nine days when a secondary hæmorrhage from the second intercostal branch of the internal mammary artery occurred. Death resulted from a further hæmorrhage on the thirteenth day. Despite the fact that death in this case was in some respects accidental and related to the particular approach used, one doubts if lobectomy was wise, since the hæmorrhage would probably have been controlled by an upper thoracoplasty. We feel therefore, that lobectomy has no place at present in the treatment of tuberculosis, with the possible exception of those relatively uncommon cases in which an

* A local thoracoplasty has since been done to close a small persistent empyema cavity.

open cavity in the lower lobe is the only residual disease.

Tumours of the lung.—For certain benign tumours of the bronchus lobectomy would seem to be the operation of choice. No such case has come under our care. For bronchogenic carcinoma it is rarely indicated, the tumour being so situated in almost every case that excision of one lobe is unlikely to result in a sufficiently wide removal. We have performed it once only, for a rather unusually localized peripherally-placed tumour. No local recurrence occurred, but the patient died of a cerebral secondary four months later.

SUMMARY

Attention is directed to the various conditions for which pulmonary lobectomy is indicated.

There is great need for a more accurate knowledge of the probable future history of patients in various stages of bronchiectasis.

Lipiodol injections should result in a complete mapping of the bronchi of all lobes.

Patients with considerable amounts of sputum should be prepared very carefully for operation.

The mortality should be much lower than one has been able to show even when only cases with severe disability are operated on.

Certain chronic lung abscesses should be treated by removal of the diseased lobe. In the presence of an active infection lobectomy should not be undertaken.

Lobectomy in tuberculosis should at present be reserved for those cases in which the only residual disease consists in a persistent cavity in one lower lobe.

Lobectomy is rarely indicated for tumours of the lung, and is probably never a suitable operation for bronchogenic carcinoma.

I feel that the future will demonstrate that the prognosis in bronchiectasis is bad both as to health and life, and that when this has been shown physicians will refer cases for operation at an earlier stage. Should this prophecy be fulfilled the mortality will, I am certain, be no longer excessive. An unhappily large percentage of the deaths in this series must be attributed to an improper choice of cases and to insufficient experience in their management. In order to maintain a proper perspective it is well to remember that many of the major operations now performed with a very small mortality carried in their earlier development a mortality as great or greater than pulmonary lobectomy. The decrease in the death rate has resulted from greater experience and reference of cases for operation at an earlier stage of the disease.

It is a pleasure to acknowledge again my indebtedness to Dr. Shenstone for the privilege of making this further report upon the progress of the work, and to extend my thanks for many suggestions in the preparation of the paper.

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LUNG ABSCESS*

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THE following is a review of 98 cases of lung abscess observed in the Toronto General Hospital during the years 1926 to 1936, inclusive. Cases in which the abscess was tuberculous or part of a general pyæmia were excluded. The cases were studied from different angles, including the etiology of the abscess, the symptoms and signs shown, and the effects of various forms of therapy. The possibility of prevention of lung abscess was also investigated.

Etiology.—Etiological classifications of lung abscess invariably include those which occur following operations on the upper respiratory tract, such as tonsillectomy or extraction of teeth. This group is represented by 29 of the 98 cases: 15 cases of tonsillectomy, only two of which were done under local anæsthesia; 12

* From the Department of Medicine, University of Toronto, and the Medical Service, Toronto General Hospital.

cases of teeth extraction, and 2 cases following antrum operation, all done under general anæsthesia.

The next two largest groups are those cases of abscess which follow pneumonia and those which arise without obvious cause and are termed "idiopathic". In the differentiation of these two groups considerable difficulty was experienced. It was difficult to determine whether the consolidation or pneumonia which initiated the inflammatory process in the lung was an ordinary pneumonia with a secondary abscess or whether it was only the initial stage of an inflammatory process destined from its inception to be a lung abscess. This difficulty in differentiating these two groups is illustrated in the wide variation (1 per cent[1] to 60 per cent[2]) in the incidence of idiopathic abscesses reported in different series studied. Thirty-two cases in this series (33 per cent) were classified as idiopathic. This group is extremely important, particularly with regard to prophylaxis, and will be discussed later. Pneumonia was considered to be the cause of the lung abscess in 19 cases (19 per cent), while post-operative pneumonia was responsible for 2 more (2 per cent). Other causes of lung abscess were embolus with infarction in 7 cases (7 per cent), bronchogenic carcinoma in 3 cases (3 per cent), and foreign body in 3 cases (3 per cent).

TABLE I.

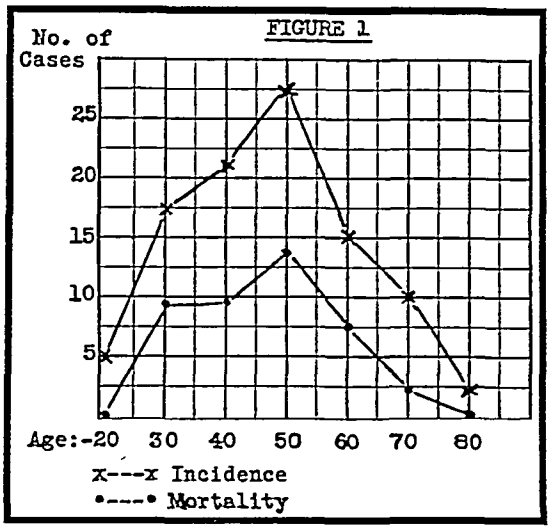
ETIOLOGY OF 98 CASES OF LUNG ABSCESS

		Number of cases	*Per cent*
Idiopathic		32	33
Post-operative:			
1. Teeth extractions	12		
2. Tonsillectomy	15		
3. Radical antrum	2	29	30
Pneumonia		19	19
Pulmonary embolism		7	7
Bronchogenic carcinoma		3	3
Foreign body		3	3
Post-operative pneumonia		2	2
Aneurysm of aorta		1	1
Silicosis		1	1
Rupture of tonsillar abscess		1	1

INCIDENCE

Age and sex.—It was shown in the study of these cases that, as in so many respiratory diseases, there is a greater incidence of lung abscess, as well as a higher mortality from it, among males than females. Seventy-two were male cases; of these 41 (57 per cent) died. Of the 26 female cases 5 (19 per cent) were fatal. The accompanying chart (Fig. 1) shows graphically the age incidence and also the mortality for age groups. It is evident that the greatest age incidence is in the fifth decade and that the mortality rate varies little with the age group.

FIGURE 1



DIAGNOSIS

Symptoms. — Systemic manifestations varied from marked ill-health with high fever to moderate malaise and temperature of only about 100°. As a rule symptoms were less than one would expect from the area of lung involved, if that involvement were due to an ordinary pneumonic consolidation.

The local respiratory manifestations varied greatly during the course of the disease. In the early stage, when there was an inflammatory process in the lung but before the abscess had ruptured into a bronchus, the patient usually had a slight cough, either non-productive or productive of only mucoid sputum. Later, when the abscess ruptured into a bronchus the patient would cough up a large quantity of purulent sputum, two to eight ounces within a few hours. The time interval between the beginning of the pneumonitis and the rupture of the abscess into a bronchus was generally from 5 to 20 days, but in several cases was as long as two, three or even six months. In certain cases (14 of this series) the abscess never drained through the bronchi but ruptured into the pleural cavity and produced a pyopneumothorax.

A characteristic symptom of a lung abscess which had not an adequate drainage through the bronchial tree was that, at intervals of a few days to a few months, the contents of the

abscess ceased to drain through the bronchus and be coughed up. This cessation of drainage was generally accompanied by a period of increased ill-health and fever which continued until the abscess again drained into the bronchus. When this occurred a considerable quantity of purulent sputum was suddenly expectorated. This process of drainage and cessation of drainage was often repeated many times. In only 38 per cent of the cases in this series did the patient notice that posture had any effect on the expectoration of sputum. Purulent sputum was foul smelling in a high percentage of cases (80 per cent) and in 54 per cent it contained blood. The amount of blood expectorated varied from one ounce to a massive hæmoptysis. A history of pleurisy was present in 70 per cent of the cases studied.

Physical signs.—Physical signs of a cavity were present in only 3 cases; of consolidation in 38; and in 32 cases only a few râles indicated the presence of the abscess. In 14 cases a pyopneumothorax was found, and in 5 an empyema. In 7 cases there were no abnormal physical signs to indicate the presence of the abscess. Paucity of physical signs is characteristic of lung abscess. This is usually explained by the situation of the abscess, which is often away from the chest wall with more or less normal lung between it and the thoracic cage.

When physical signs were present in these cases they indicated the location of the abscess as follows: right lower lobe in 46 cases; left lower lobe in 20 cases; right upper lobe in 21 cases; left upper lobe in 8 cases. Abscess occurred in the right lung twice as often as in the left lung, and twice as often in the lower lobe as in the upper lobe. In bronchiectasis, from which at times it is difficult to distinguish, the location is reversed, there being twice as many cases of bronchiectasis in the lower left lobe as in the lower right lobe. Clubbed fingers occurred in 26 (26 per cent) of our cases, a similar incidence to that found in bronchiectasis.

A history frequently encountered in the cases of lung abscess which were secondary to operation on the upper respiratory tract, such as tonsillectomy, was as follows. For the first seven days after operation the patient did not feel as well as was expected. The temperature was between 100 and 101° F. and slight, unproductive cough was present. These symptoms were usually attributed to the operative site, or if lung abscess was considered as a diagnosis the very few abnormal physical signs found in the chest were taken as evidence against this possibility. However on about the seventh day the patient coughed up a quantity of foul-smelling pus, and thus the diagnosis of lung abscess was made.

X-ray examination.—X-ray films were usually characteristic, showing a typical hazy area of infiltration in the lung and the abscess cavity clearly visible. It was remarkable how much consolidation was shown with x-ray examination and yet so few physical signs were present. For localization of the position of the abscess, which is so important for proper medical or surgical treatment, it was found preferable to have a lateral as well as stereoscopic films made. If these were not sufficient for accurate localization films were made at various angles. We were usually able to tell whether the abscess was single or multiple by x-ray examination. It was shown that 70 cases had single abscesses and 20 multiple abscesses.

TREATMENT

There is considerable difference of opinion regarding various methods of treating lung abscess. The chief difficulty is to determine when medical treatment should be supplemented by surgical measures. The various types of so-called medical treatment tried in this series consist of postural drainage, induction of pneumothorax, and bronchoscopic drainage. Besides these we have given intravenous arsenic treatment to some patients with foul sputum but were unable to see any beneficial results.

Postural drainage.—In the present series it was possible to employ postural drainage in 73 of the 98 patients treated. Of these, 31 were treated by postural drainage alone with the following results: 17 were cured; 7 died; and 7 others were not symptomatically cured. In the other 42 cases it was decided for various reasons, usually because the patient was not improving under postural drainage alone, that some other form of therapy should be used as well. It is the question of when to supplement postural drainage with other methods of treatment which is difficult to decide. The indications, as we have used them, for the instigation of other forms of therapy will be considered as these various methods of treatment are discussed.

Postural drainage is the best form of medical treatment when used in conjunction with gen-

eral treatment such as rest, nursing care, etc. The procedure of postural drainage was carried out by placing the patient in such a position that the abscess cavity drained through the bronchus and the pus was coughed up. This was accomplished efficiently only when the exact location of the abscess and the best position for drainage were ascertained. Considerable experimenting was necessary before the position was discovered in which the patient coughed up the greatest amount of pus with the least effort. In apical abscesses the upright or lateral positions were usually the most effective. In basal abscesses the patient was usually required to lean over the side of the bed with the head much lower than the hips. This position was assumed for not longer than five minutes, and was resumed at varying intervals of from two to twelve hours. The interval between "posturing" depended entirely on the general condition of the patient and on how rapidly the pus was collecting in the abscess cavity. Continuous postural drainage of a basal abscess where the patient was kept constantly in a position with the head lower than the hips was generally found to be too uncomfortable, and usually was unsuitable for adult patients.

Pneumothorax therapy was attempted in 16 cases but a satisfactory collapse was established in only 8 of these. Of this group 3 (37 per cent) were cured; 2 (25 per cent) died; and 3 (37 per cent) were not symptomatically cured. Pyopneumothorax developed in 3 cases (37 per cent) in which pneumothorax therapy was carried out, while it was present in only 16 per cent of those not receiving this form of treatment. It is apparent that the induction of pneumothorax increased the incidence of pyopneumothorax, a serious complication.

Collapse of a lung abscess by artificial pneumothorax is a procedure which is fraught with considerable danger, chiefly due to the possibility of producing a pyopneumothorax. We have not used this form of treatment unless after six weeks from the onset of the disease the patient was not improving. Pneumothorax was considered then only if there was nothing to suggest the possible presence of old pleural adhesions, and if the abscess was centrally placed in the lung and not near a pleural surface. Pneumothorax therapy should seldom be used in the treatment of lung abscess. Cases should be carefully selected and the pneumothorax induced with extreme care.

Bronchoscopic drainage. — Bronchoscopic examination was made if there was any question of the presence of a foreign body as the cause of the abscess. In idiopathic abscesses occurring in patients of the cancer-age group bronchoscopic examination was made to determine if neoplasm was the cause of the abscess. This method of examination was of little value in the exact localization of an abscess, and was of little or no value in increasing the efficiency of postural drainage by the removal of granulation tissue from the lumen of the bronchus draining the abscess. There seemed to be no justification for repeated bronchoscopic examinations with aspiration of the contents of the abscess.

Bronchoscopic examination is not without danger when an acute inflammatory lesion of the lung, such as lung abscess, is present, and we believe its use should be limited to the removal of a foreign body or to the investigation of the possibility of a bronchial tumour as the cause of the abscess.

Surgical treatment. — The type of surgical treatment most frequently used was open drainage of the abscess through the chest wall. As stated above, it is extremely difficult to determine when a patient should be advised to discontinue postural drainage and have surgical interference of this kind. In our cases operation was advised only when the abscess was relatively close to the chest wall and therefore easily reached. Further, only patients who showed no improvement under prolonged medical treatment or were progressing unfavourably were operated upon. Open drainage was performed on 15 patients, with a mortality of 53 per cent. In many of these open drainage was performed when the abscess was obviously progressing rapidly and the outlook almost hopeless. An attempt was made to show the relationship of the activity of the abscess and its duration at the time of operation to the mortality. The cases that did well with open drainage were those in which there was little evidence of activity as measured by the spread of the pneumonic process about the abscess, elevated temperature, and increased white blood count. The duration of the abscess from its onset until the operation was performed varied from three months to two years. The mortality did not

appear to be influenced by the duration of the disease before operation.

It has been recommended[3] that abscesses be surgically drained very early. In this way better surgical statistics can be obtained, but it seems certain from a study of our cases that by doing this many patients would be operated upon who would recover with postural drainage and never need an operation. When an abscess is drained only when there are indications that a spontaneous cure is not probable figures similar to those given in this study are obtained.[4] We believe that a patient should be given at least six weeks' medical treatment, to see if he is going to be cured by this means before being operated upon. Patients showing slight improvement under medical treatment should have it continued for long periods of time before resorting to surgical drainage. Some of the patients brought back for follow-up in this series had failed to improve markedly under medical treatment, and operation had been recommended but refused. In several of these cases it was found that the continued medical treatment carried out at home over a period of many months had resulted in a cure of the abscess. It is probable, therefore, that patients showing any response to medical treatment should have it continued for many months before surgical treatment is considered.

Thoracoplasty was performed on 12 patients, with a mortality of 33 per cent. Again it appeared that those patients did well in whom the abscess was inactive, as judged by spread of pneumonia, elevated temperature, and white blood cell count. Thoracoplasty should only be performed when the abscess is not healing, is relatively inactive, and when, due to its central location or the presence of multiple abscesses, open drainage is inadvisable. Pyopneumothorax was present in 18 cases and surgical treatment by drainage of the pleural cavity was, of course, instituted as soon as possible. The mortality in this group was 38 per cent. It appears that for a lung abscess to drain into the pleural cavity is a serious complication, and even with immediate and adequate drainage the mortality is high.

Lobectomy was performed in 7 cases of this series, with a mortality of 86 per cent. Most of these patients had marked infection about multiple abscesses and, in the light of our present knowledge, were not suitable for lobectomy. Relatively non-infected cases, with hæmorrhage from a centrally placed abscess as the disabling factor, would appear the only cases suitable for lobectomy. Because of its high mortality rate lobectomy has a limited field in the treatment of lung abscess. Phrenicotomy was performed in 11 cases, and not only appeared to be of no value in closing the abscess but occasionally interfered with the drainage of the abscess, with resulting harmful effects.

TABLE II.

RESULTS OF TREATMENT IN 98 CASES OF LUNG ABSCESS

Treatment	*Number of cases*	*Cured*		*Died*		*Persisting abscess or broncho-pleural fistula*
		No.	%	No.	%	
Postural drainage..	73	17	23	7	10	7
Pneumothorax....	8	3	37	2	25	3
Open drainage....	15	1	7	8	53	6
Thoracoplasty....	12	4	33	4	33	4
Empyema drainage	16	3	19	6	37	7
Lobectomy.....	7	1	14	6	86	0
Phrenicotomy.....	11	0	..	0	..	11

COMPLICATIONS

The most common complication was rupture of the abscess into the pleural cavity. This occurred in 14 (14 per cent) of our cases. Bronchiectasis resulted from the lung abscess in 13 cases and added considerably to the difficulty of effecting a cure. Fatal hæmorhage from the abscess occurred in 4 cases. Brain abscess was present in only 3 cases, while brain embolism occurred but once.

PROGNOSIS

The prognosis in this series was: patients cured, 29 (30 per cent); patients died, 46 (47 per cent); patients not symptomatically cured, 23 (23 per cent). The cases classified as not symptomatically cured all had the abscess or a broncho-pleural fistula remaining. The prognosis for each etiological group and for the different lobes involved was determined. See Table III.

TABLE III.

ETIOLOGY AND LOCATION OF ABSCESS IN 98 CASES OF LUNG ABSCESS

Etiology	*Died*	*Location of abscess*	*Died*
	Per cent		Per cent
Idiopathic.....	40	Right upper lobe.....	57
Post-operative.....	36	Left upper lobe.....	75
Pneumonia.....	75	Right lower lobe.....	43
Embolus with infarction	0	Left lower lobe.....	58

PROPHYLAXIS

Lung abscess has a mortality rate of about 50 per cent. It is particularly necessary, therefore, to attempt to decrease the incidence of the disease. The various causes of lung abscess were considered to determine whether the etiological factor could be prevented and thus the number of cases of lung abscess decreased.

One group which should be considered from a prophylactic standpoint is that of cases which follow upper respiratory operations, *e.g.*, tonsillectomy and teeth extraction. In the present series 29 cases occurred after this type of operation; 12 of these followed the extraction of several teeth at one time under general anæsthesia. The anæsthetic used was ether, and with this no adequate attempt was made, nor can be made, to block the pharynx and prevent aspiration of foreign material into the lungs. In comparison, in a very large series of general hospital cases where teeth were removed under local anæsthetic, or where a few were removed at a time with a gas anæsthetic, no lung abscesses developed. It seems obvious, therefore, that lung abscesses occurring secondary to teeth extraction could be completely or almost completely eliminated if teeth were extracted under local anæsthesia, or if a few teeth only were removed under general anæsthesia, and care taken to prevent the aspiration of foreign matter into the lungs.

In 15 cases of lung abscess following tonsillectomy the operation was done under general anæsthesia in 13 and under local anæsthesia in two. While there is some difference of opinion on this point, we believe the incidence of post-tonsillectomy lung abscess would be markedly decreased if this operation were performed under local anæsthesia. We had no instances of lung abscess following antra operations when this operation was performed under local anæsthesia, while in two cases abscesses resulted from antra operations done under general anæsthesia. While the etiology of the idiopathic group is obscure, it is probable that many of these abscesses could be prevented. Some theories as to the cause of the abscesses occurring in this group are undiagnosed bronchogenic carcinoma, blood-borne infections secondary to a remote focus of infection, unresolved pneumonia, and inhalation of infected material from the upper respiratory passages apart from an operation.

While undiagnosed bronchogenic carcinoma may account for a very small number of idiopathic abscesses we believe it to be very uncommon for the following reasons. Of the 32 cases classified as idiopathic in origin, twelve died and of these there were post-mortem examinations on eight. In none of these was cancer found as the cause of the abscess. Also, in the follow-up on the remaining cases of this series, only one patient with an idiopathic abscess had died after leaving hospital. It seems probable that if many of these idiopathic cases were secondary to cancer more would have died subsequently to discharge from hospital.

Blood-borne infection, either with or without large emboli, is an obvious cause of some abscesses (7 per cent of this series). Because of this and the relative ease of producing lung abscess experimentally by emboli,[5] blood-borne infection has been considered by many as the common cause of idiopathic abscess. If so-called idiopathic abscesses were due to blood-borne infection one would expect to find certain differences between them and post-operative abscesses which we attribute to inhalation of infected material, particularly with regard to the location of the abscess and the presence or absence of foul sputum. Practically all post-operative cases of lung abscess have foul sputum, and two-thirds of these abscesses are situated in the lower lobes. In the idiopathic group there was not as high a percentage with foul sputum, and there was also a lower percentage of abscesses occurring in the lower lobes. This comparison, as shown in Table IV, indicates that

TABLE IV.

	Idiopathic (32 cases)		*Post-operative (29 cases)*	
	No.	Per cent	No.	Per cent
Foul sputum	20	62.5	28	96.6
Location:				
Right lower lobe	12	37.5	17	60.7
Right upper lobe	9	28.1	6	21.4
Left lower lobe	7	21.9	4	14.3
Left upper lobe	4	12.5	1	3.6

some of the idiopathic group are probably not due to inhalation of infected material and possibly are due to blood-borne infection. However there is sufficient similarity between the two groups to suggest the possibility of inhalation of infected material as a probable cause of many of these idiopathic abscesses. The 32 idiopathic cases, therefore, were compared with

the same number of cases of approximately the same age group admitted to the hospital with heart disease with regard to the presence of a greater than normal source for this infected material in the upper respiratory passages. The incidence of previous pneumonia and acute respiratory infections in the two groups was also compared (Table V) because of another theory

TABLE V.

Incidence of respiratory infection	*Idiopathic lung abscess (82 cases)*		*Control group (82 cases)*	
	No.	Per cent	No.	Per cent
Bronchopneumonia (previous).	5	15.6	7	21.9
Chronic nose and throat infection	2	6.3	4	12.5
Repeated acute nose and throat infections	5	15.6	4	12.5
Diseased teeth and gums	13	40.6	7	21.9

of the origin of these idiopathic cases expressed by the late Professor Oskar Klotz[6] who believed that they may originate from an old pneumonia which has failed to resolve. It will be seen that neither previous pneumonia nor upper respiratory infection, either acute or chronic, appears to be a factor in the production of these idiopathic lung abscesses. However, the condition of the teeth and gums was definitely worse in those patients with idiopathic lung abscess than in the control group not suffering from lung abscess. We agree with Stern[7] that it is highly probable that a large percentage of so-called idiopathic lung abscesses are caused by the inhalation of infected material from badly diseased teeth and gums. It is probable that a large percentage of these idiopathic abscesses could be eliminated if better oral hygiene were practised.

SUMMARY

In a study of 98 cases of lung abscess the etiology, symptoms, signs, treatment, complications and prognosis have been reviewed. The unsatisfactory results of the various forms of treatment emphasize the importance of prophylaxis. It is concluded that many lung abscesses could be prevented if the technique of anæsthesia used in certain operations on the upper respiratory tract was changed. Better oral hygiene would also eliminate a fairly large percentage of cases of lung abscess.

The author wishes to express his thanks to Professor Graham, Department of Medicine, for advice during this study, and also to Dr. N. S. Shenstone and Dr. R. M. Janes, Department of Surgery, for their cooperation in the treatment of many of the cases studied, and for permission to include in this study some cases admitted directly to the Surgical Division.

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MATERNAL MORTALITY IN COUNTRY PRACTICE

BY J. H. DUNCAN, M.D., C.M.

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IN 1926 Premier King appointed a commission to study this subject and report. Two years later Dr. Helen MacMurchy, chairman of the commission, responded with her "Maternal Mortality in Canada". This treatise will always be a landmark in America. I am a country doctor, so will refer chiefly to confinements in the home.

Pre-natal attention claims our closest thought. It is sometimes difficult, but we must avoid exciting the patient. I never measure the pelvis. And since Dr. Hendrie introduced his "less salt diet" this advice seems good. It is very odd that Hippocrates enunciated the physiological requirements to prevent convulsions and that it took the accumulated wisdom of twenty-four centuries to figure it out on a basis of salt. Now we speak of vitamins; very good. Or we might continue to urge the greatest possible variety of foods and fruit drinks. And it is all important that this creates a better atmosphere.

And shall we send her to a hospital? The MacMurchy report says that the preventable deaths are probably more than twice as frequent in urban hospitals as in rural territory. I practised thirty-three years before Dr. MacMurchy

began her report and there was only one death in my practice; and it was instantaneous, from pulmonary embolism next day. Dr. MacMurchy found two others. My cases cover death from any cause after conception and before the babe is a year old. In my forty-five years there has not been a preventable death.

In a general way, any "better housing program" is planned for the cities, and, in the ultimate analysis, farm production pays much of it. Would not a progressive community spend some of this money in the country? Sometimes the construction of one city hospital bed costs as much as ten would in the country. One program house would put a room on each of a dozen farm houses, yes more; and the country home gives so much more economy and efficiency. Should not we in the future concentrate a bit more on the farm homes? What is more pathetic than to see the sick racing across country, it may be ten miles, it may be seventy-five? And it may be in a thunderstorm or with a thirty below blizzard in the offing? What more fatal?

Is it ever desirable and permissible to remove a living fetus before the viable age? I have always thought so. Yet in my forty-five years' practice I have not seen a case that was even debatable. Accidental miscarriages occur occasionally, and they are more fatal than delivery at term. This is partly because the uterus is not now prepared to contract nor are sufficient antisepsis and blood-clotting properties developed. And all too often there is a delay in calling the doctor; the temperature may be 105° when the patient is first seen. If this is the case before infection has developed the uterus should be emptied. But if the temperature is up and the discharges are offensive, I have always treated these cases by washing out as much infection as possible, perhaps daily, and with the least possible amount of disturbance. Those who demand more energetic action are dangerous.

We see quite a few cases of criminal abortion where the operators took fright and left their patients. These are, of course, in bad shape before being deserted. They are in all respects similar to accidental cases, with the serious possibility of added trauma, infection, or drug poisoning. And sometimes the maternal conscience begins to prick and the will to live is gone.

It has been my luck to have practised in territory where a graduate nurse was seldom obtainable. Usually a part-time nurse or some neighbour woman was available. And why complain? Their score is generally fair. But I have been alone and had to gather buffalo chips to light and keep the fire in a frosty one-room shack.

Forty-five years ago anæsthesia was not universally practised in obstetrics. Our choice was between chloroform and ether. Chloroform seemed best. Well, an inexperienced person can give it with perfect safety and very good results, if a tumbler half full of gauze or absorbent cotton is used. I have never felt that the ordinary mask is safe in the hands of the inexperienced. Then, too, chloroform, properly administered, always steadies and strengthens the heart and quickens the pains and renders them more effective. Shock is reduced, and even in heart cases the margin of safety is usually increased. But here the help of an expert, at least a graduate nurse, should be had if possible. Only once, in a case of contracted pelvis and a bad heart, was I able to get medical aid and my assistant handled the chloroform brilliantly. With her next baby the woman was in expert hands in a city hospital and died undelivered. With newer anæsthetics such as twilight sleep I have no experience. And why seek it?

Cleanliness is vital. Cases must in no way contact each other. The best mattress cover is paper. Newspapers may be swarming with microbes but they do not carry dangerous germs. In any case they should be baked in the oven. Mrs. Duncan, and she is not a nurse, has always cleaned my gloves and instruments for forty-five years, and the score is 100 per cent. The hands and forearms must be washed in antiseptic solution for fifteen minutes, with, anyway, three renewals of water. Don't use a brush or jacknife. The obstetric hand must contact only the field of operation. I never wear gloves. They are used only when working on boils, other infections, or dirt, to keep my hands clean. A delivery at term is wonderfully protected by nature against infection. Don't douche this protection away. When labour is over first wash the parts gently, then bathe where necessary; don't part the labia. I dust borochloretone all around the vulva, yes, quite widely, and put on a pad of iodoform gauze, renewed daily or oftener, as long as necessary.

In my entire practice no patient has shown signs of sepsis, and only four were not out of bed on the tenth day.

It is often said that 15 per cent of us are syphilitic. In my experience I am sure there has not been a quarter of 1 per cent.

When dilatation is necessary I use the hand. In early miscarriage other methods may be considered. As I become more confident of cleanliness, turning to first position grows on me. And this extends even to breech presentations. If the baby is dead podalic version may be considered. Twenty-five years ago the literature frequently stated that the most difficult operation in all surgery is the high forceps, and that deaths therefrom range from 25 to 40 per cent. Odd, but it seems there is not 1 per cent in the country practices. Perhaps the obstetrician's hardest problem sometimes is to decide between this and Cæsarean section. Section has a vital place, but with it I have no experience, and with high forceps I have had no failure.

Bad hæmorrhages are less common now. Pass the hand to the fundus and gently massage the uterus with both hands while the obstetric hand is being slowly withdrawn, removing all clots, etc. This irons out all irregular contractions. Pituitrin or ergotin are usually sufficient. If the bleeding is due to a purpuric condition of the blood give ten drops of ol. terebinthinæ. Repetition is seldom required. This applies also to non-puerperal cases. When collapsed from bleeding, cold water, sipped slowly, is the best revivifier. I have never used transfusion. The only routine medication used has been a pill of iron, arsenic and strychnine for a fortnight post partum.

How do we avoid preventable deaths? When I began practice it was customary to douche the patient daily for a week. That seemed superfluous to me. The best way to avoid infecting is for one not to get infected, and when gloves became obtainable I used them to that end, and had my touch unimpaired for such as high forceps. And, at that, some people may be carriers; in that case a bacteriologist should be consulted. Visitors were encouraged but limited. The nurse was expected to do as she was told, and, may be the telling was sometimes a bit harsh. But that mother's life was the stake and perhaps nothing but the bitterest fight would win.

I never could find a place for the curette. Those who introduced pituitrin gave enormous doses, 10 c.c., to hasten delivery. I began with 5 per cent of the prescribed dose and gave it just after the birth of the babe. I have never given pituitrin in any other quantity or at any other stage of delivery at term. Now I use it very often. Antisera were never used in septic miscarriages.

The psychological management of any case, and especially if the patient is nervous or the subject of criminal abortion, needs the fullest attention.

And don't pursue each *ignis fatuus* as it appears on the horizon; when I find a good drug or method I use it as long as it does the work.

Formerly extensive tears of the perineum were common. Then an immediate repair usually healed; but not always. And all too often it was not a perfect restoration. Frequently the scar tore with the next child. Lawson Tait designed an operation to repair these tears and became immortal. Now the physician sees a tear is imminent and uses the scissors in the hope that coaptation will be better. In fact, in a hospital in one of our largest cities this is routine. These tears certainly increase the risk of infection. And a repaired perineum is less efficient. For many years I have practised a method of delivery that obviates all tearing, even in primiparæ. With dorsal position, the knees well up, when the head is stretching the soft parts place a pad of absorbent cotton across the perineum and over the ischia. With the delivery hand place the thumb on one ischium and the fingers on the other. Keep the hand fairly rigidly open and press it into the pelvis to engage the front of the babe's head. This carries the soft parts from over the front of the child's head. This also carries the soft parts from over the ischia at the finger tips and wrinkles the formerly taut perineum. Now you can increase flexion, mould the head, and, the obstruction gone, you can speed up delivery by shoving the occiput over the pubes and away from the perineum. By giving this picture suitable individuality tears are rare indeed. But misjudgment will occur.

THE ADMINISTRATION OF BISMUTH

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BISMUTH was introduced in 1921 for the treatment of syphilis as an adjunct to the arsphenamines in place of mercury. Today there is general agreement that it is a better adjunct than mercury, though there are some who do not hold to this point of view. It was given at first as the sodium and potassium bismuth tartrate by intramuscular injections. Since then various other forms for injection have been used, and more recently it has been suggested that it may be given by mouth. At the suggestion of a clinical colleague, it was decided to experiment with a new bismuth preparation known as bisiodide, and the Salb Laboratories, by whom it was manufactured, informed us that this crystalline compound was a hexamethelene (hexamine) bismuth iodide, $(CH_2)_6N_4HI.BiI_3$, and furnished adequate information so that its chemical composition could be checked by analysis and preparation. The facts introduced from our study of this compound are used only to indicate principles of absorption, distribution and elimination, without making at the present any claims in regard to its therapeutic efficiency.

The preparations employed for intramuscular injections may be divided into two types, in the first of which the bismuth preparation is readily soluble. Two of the commonly employed members of this group are sodium and/or potassium bismuth tartrate, given in aqueous solution; and the campho-carbonate of bismuth (bismo-cymol), an oil-soluble preparation. All these are more or less painful on injection and release bismuth to the body rapidly. Iodobismitol, a 6 per cent solution of sodium iodobismuthite, Na_2BiI_5, in ethylene glycol, with 12 per cent of sodium iodide, has been shown by Hanzlik[1] to be curative in rabbit syphilis. Its excretion in man has been studied by Sollman *et al.*[2] Sobisminol, sodium bismuthate, $NaBiO_3$, in a complex formed with triisopropanolamine, propylene glycol and water, has recently been introduced by Hanzlik,[3] and is claimed by him to be curative. Both these are painful. The second, the less soluble type, includes the metal in an oil suspension, not painful, (Injectio Bismuthi B.P.), the salicylate in oil (Injectio Bismuthi Salicylatis B.P.), the oxychloride in water (Injectio Bismuthi Oxychloridi B.P.), which again is painful, and the insoluble forms of sodium potassium bismuth tartrate and bismuth hydroxides in water, which are painful but less so than the soluble forms. Bismarsen is a bismuth derivative of arsphenamine methylene sulphonate containing both bismuth and arsenic, which is quite widely used.

Though various observers are by no means in agreement as to which of the above-mentioned, and of other preparations not referred to, is the best, it is generally accepted that bismuth by injection will aid in producing negative serological findings in syphilis.

From the site of injection bismuth is absorbed, evidently in some complex form, and carried to the tissues. The soluble forms leave the depots more rapidly, while not all of the insoluble forms may be removed in a month or more. Analyses of the organs of animals which had received injected bismuth show that bismuth is deposited most readily in the kidneys, intestine, spleen, liver, muscle and brain, in descending order. The amounts of bismuth found are reported as milligrams of bismuth per 100 grams of tissue. Hanzlik's findings after injections of sodium bismuth thioglycollate in rabbits are—kidney 5.4, liver 2.1; after bismuth oxychloride, kidney 2.7, liver 0.31; after sodium iodobismuthite, kidney 2.2 to 5.2, liver 0.02 to 0.05. Lomholt's findings after injections of bismuth oxychloride in guinea pigs are—kidney 2.5 to 3.6, large intestine 0.8 to 0.85, spleen 0.2 to 0.4, liver 0.16 to 2.7, muscle 0.013 to 0.037, brain 0.018 to 0.102. Kolmer, after oral bismuth in rabbits, reports the following—kidney 0.31 and liver 0.22. Very small quantities have been obtained by the most reliable workers from the brain. From the cerebrospinal fluid, Hanzlik, Lehmann and Richardson have reported in man and animals only amounts which are exceedingly small.

A considerable part of the injected bismuth is excreted in the urine, while part appears in the fæces. Dependent on the compound used, the total urinary excretion varies greatly, but

rarely will 20 per cent appear in the urine in a fortnight (Lomholt[4]). A proportion, averaging about 4 to 5 per cent, is excreted in the fæces. According to Lomholt retention in tissues other than the injection depots does not last long, and gradually decreases, though other observers differ with him on this point.

The question of the elimination of injected bismuth is important, as the urinary excretion forms the best method of judging the level of the circulatory and presumably effective bismuth for the destruction of the spirochætes. It is generally agreed that the more continuously a high but not toxic level of circulatory and urinary bismuth, the more beneficial the therapy is likely to be (Lomholt and others); and as the more soluble the form injected, the more rapidly the level of the circulatory and urinary bismuth rises and falls, the more frequent the injections must be to maintain an adequate level. With the more insoluble forms, bismuth itself, for example, the greater is the difficulty in obtaining an adequate level.

Very few authors have made careful comparative studies of the therapeutic efficiency of bismuth compounds used in conjunction with arsenic. In the French literature many curative claims have been advanced for various bismuth preparations, but again one finds no good basis for the comparison of their therapeutic efficiency. Lomholt, after using various preparations, adopted the oxychloride in a fine aqueous suspension, and in conjunction with arsenicals obtained 94 per cent of negative Wassermann reactions in 154 patients. The patients received about 35 injections, each of which contained 150 to 200 mg. of the oxychloride, or 120 to 160 mg. of bismuth.

Irgang *et al.*[5] present an excellent study:

	Cases	*Injections*	*Total Bi*	*Cure*
Bismuth salicylate in oil	21	15 weekly	1500 mg.	80.9 per cent
Bismo-cymol in oil	19	15 weekly	1500 mg.	68.0 per cent
Bismuth sodium tartrate solution in water	19	20 biweekly	440 mg.	63.0 per cent
Quinine bismuth iodide in oil	19	15 weekly	1065 mg.	63.0 per cent

Considering the dosage alone, the tartrate gave best results, though the salicylate gave a greater percentage of "cures", which means negative Wassermann tests.

Wright[6] used potassium bismuth tartrate (soluble?), 100 mg. weekly, and of 102 cases not Wassermann-negative with arsenic 52 per cent became so after 15 injections of bismuth. In a series of congenital syphilities he had 80 per cent of permanent negative Wassermanns. Lees,[7] with a large experience, pronounces in favour of an insoluble bismuth in very fine suspension in isotonic glucose solution.

Cannon and Robertson,[8] in an extensive study to compare the action of bismuth and mercury as adjuncts for arsenical treatment of syphilis, used the water-soluble sodium potassium bismuth tartrate suspended in oil, because it was absorbed more readily than the insoluble bismuth salicylate, but more slowly than some other watery or oil solutions. Raiziss[9] had previously pointed out that the injection of this preparation was relatively painless and produced few toxic effects. It was preferred to potassium bismuth tartrate because of its higher bismuth content. Bismo-cymol (N.N.R.) was also employed, 1,350 mg. bismuth metal in 15 injections. Patients who had difficulty in tolerating the oil-suspended salt usually could tolerate this preparation. Both preparations gave very satisfactory results. Apparently in none of these cases was any urinary analysis done and the authors had no criteria for the maintenance of therapeutic level. A more or less marked blue line on the gum was usually present in the cases of Lomholt, Irgang and Cannon.

A study of the literature therefore reveals that more intense and carefully controlled work must be carried out before it becomes evident which preparation is best suited to produce curative effects, and the work of Sollmann on the excretion of injected bismuth makes it evident that the spacing of the injections will depend on the character of the substance used.

Oral bismuth.—The difficulty of oral administration lies in obtaining a compound readily absorbed. Most bismuth salts are insoluble, or are readily transformed by the hydrochloric acid of the gastric juice into the relatively insoluble oxychloride. Further, most bismuth compounds give with the carbonates, and especially with the sulphides of the lower bowel, extremely insoluble compounds. If an oral method of administration is to be employed one would expect it to be successful only if it gave as high and as constant a level of urinary excretion as can be obtained with injected bismuth.

The earlier observers who reported clinically successful use of the oral route did not follow the excretion.

Brigham[10] in 1933 reported clinical success with a glycerite of bismuth sodium tartrate; Mulzer and Serefis[11] with a complex liver compound (Bismutrat); and Kolmer, Brown and Rule[12] cured rabbit syphilis with an oral preparation of potassium bismuth tartrate. Other observers have also reported favourable effects. Hanzlik has presented evidence that his sobisminol is absorbed in part from the intestinal canal and excreted in the urine. About 1/1,000 of the amount of the bismuth fed as sobisminol appears in the urine of man, and indeed in amounts which are comparable to that obtained with injected bismuth, namely, a median figure of about 3 mg. per diem, though about 50 per cent of the patients showed 1 mg. or less.

In order to study the absorption, distribution and elimination, an exact quantitative method must be employed, and many of the figures reported in the literature in which an exact method was not used show unduly high amounts. Study has revealed that the method of Hanzlik is the best. This method has been employed with two minor modifications, both making for greater accuracy; first the use of the Evelyn photoelectric colorimeter, which avoids the subjective error of colour comparison, and secondly the use of an aliquot of the specimen to be examined, with the addition of water in place of the potassium iodide which develops the bismuth colour, as the blank.

The first experiments with bisiodide were performed on cats and dogs to ascertain the distribution and content of bismuth in tissues and the level of urine excretion. A cat given orally 260 mg. (64 mg. Bi), a huge dose, daily for about 2 months, at the end of that period showed evidence of bismuth poisoning. It was mangy, had stiff sore legs, and became exceedingly cross. Analyses showed that per 100 grams of tissue, the kidney contained 5.5 mg. of bismuth, the liver 0.10 mg. Histological examination showed marked kidney damage.

A dog given 520 mg. (130 mg. Bi) daily, a much smaller dose per kg. than the cat received, did not show signs of poisoning. He was killed in about 6 weeks. Per 100 grams of tissue, the kidney showed 5.2 mg. of bismuth, the liver 0.130 mg., muscle 0.30 mg., with brain tissue practically free from the metal.

A second dog fed 520 mg. (130 mg. Bi) daily, was killed at the end of 2½ months. Per 100 grams of tissue the kidneys showed 2.0 mg. of bismuth, the liver 0.11 mg., the spleen 0.045 mg. the brain (45 g. analyzed) about 0.009 mg. Urine collected from the bladder at death contained 0.12 mg. of bismuth per 100 c.c. One day's urine examined on a single day during the 1st, 4th, 5th, 7th, 10th and 11th weeks contained 0.80, 0.05, 0.80, 0.24, 0.15, 0.14 mg. of bismuth, respectively.

A third dog weighing 12 kg., has been given 2 capsules of bisiodide (130 mg. Bi) daily, except Sundays, since July 7th, except for a withdrawal period in November and another at the end of January, when he began to show signs of bismuth intoxication. The daily bismuth output was 1.2, 1.2, 0.2, 0.9, 0.54, 0.56, 0.75, 0.70, 0.34 mg. The highest daily excretion was 0.09 mg. per kg. and the general run was about 0.05 mg. per kg. per day. On November 25th, the bismuth was taken away. The daily excretion decreased, 0.16, 0.29, 0.28, 0.14, 0.12, 0.10, 0.07, 0.11, 0.04, 0.03 mg. on successive days.

In a hospital under careful medical supervision bisiodide has been given to patients and the urinary excretion followed. In some instances the urinary excretion was measured from the time the drug was given and in others some time during the course of administration, when the clinician wished to learn the level of excretion. The following table shows the urinary excretion of three patients on a low dosage of bisiodide.

Patient	*Bisiodide given*		*Aver. vol. of urine c.c.*	*Mg. Bi daily*	*Time in days*	*Fraction of Bi fed excreted*
	Capsules	*Bi content mg.*				
J.M.	3	195	3300	0.420	7	1/500
J.	3	195	1250	0.400	14	1/500
N.S.	3	195	1400	0.180	8	1/1000

J.M.—Three capsules daily administered for a month before analysis made.
J.—Analysis of urine one week after Bisiodide was taken and analysis continued for 2 weeks. Urinary excretion rose gradually from 0.20 mg. to 0.67 mg. daily.
N.S.—Urinary excretion from beginning of administration of Bisiodide increased from 0.10 mg. on the 1st day to 0.30 mg. on the 8th day.

A fourth patient (F.) was given an injection of 130 mg. of bismuth oxychloride on November 19th. A urine analysis was made until November 30th. Urinary excretion ran about 0.5 mg. daily. He was then given 9 capsules of bisiodide daily (585 mg. Bi) and urinary excretion was followed until December 15th. The daily average was 0.70 mg., gradually increasing from 0.5 to over 1 mg. daily. Evidently the bisiodide was adding to the bismuth excretion, and no doubt during this interval the elimination from the one dose of intramuscular bismuth had decreased.

A fifth patient (J.S.) was given 130 mg. of bismuth oxychloride intramuscularly on August 5th, 12th, 26th, and September 2nd and November 18th. He was given bisiodide, 6 capsules daily, from December 12th to 14th, and 9 capsules daily (585 mg. Bi) from then on. The urinary excretion prior to the administration of bisiodide was about 0.8 mg. daily. The daily average from December 13th to 26th was 1.7 mg. This patient evidently was excreting about 0.9 mg. on a dose of 585 mg. of bismuth daily, which is about 1/650 of the amount administered.

If bisiodide is dissolved in 0.3 hydrochloric acid and kept at 37° C. for 3 hours only a portion is precipitated, the rest remaining in solution.

It is evident from the figures presented in regard to bisiodide and from the literature that absorption of bismuth from the intestinal canal does occur if the proper compound is used, but there are not enough clinical data for any of the compounds to justify the replacement of injected by oral bismuth as yet. Nevertheless, oral bismuth may form a useful adjunct to injections, or may, with further study, justify its being used exclusively.

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WHOOPING-COUGH*

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IN 1935 the authors[1] reported on the bacteriological diagnosis of whooping-cough by use of the cough-plate method. They also recorded differences between freshly isolated and old stock strains of *H. Pertussis*. In 1937 a short report[2] was published on active immunization which suggested that it was desirable to extend our studies on the prophylactic use of vaccine. The present report may conveniently be divided into three parts.

Part I.—The cough plate in the diagnosis of whooping-cough. Part II.—The use of vaccine in prophylaxis. Part III.—The enhancement of the virulence of freshly isolated strains of *H. pertussis* in mice, and protection of mice against such strains by vaccination.

PART I.

It was reported[1] that 98 per cent of children during the first week of whooping-cough have positive cultures for *H. pertussis* when cough

* From the Wards and Laboratories of the Hospital for Sick Children and the Department of Pædiatrics, University of Toronto, under the direction of Alan Brown, M.D., F.R.C.P.(C.), and from the Connaught Laboratories, University of Toronto, under the direction of Prof. J. G. FitzGerald.

plates are taken in duplicate. Most of the cultures in that series were taken by one of us (N.S.). This study has been continued, with the difference that most of the cough plates have been taken by physicians, nurses and parents. The two investigations are included in this study. Between 1933 and 1937 inclusive 970 cough-plates have been taken in duplicate from children suspected of having whooping-cough. For approximately three years of the five-year period, physicians have made use of cough plates early in various diseases in which coughing was a symptom. Out of the 970 children examined 402 were reported as not having whooping-cough clinically. This group of 402 were all bacteriologically negative. There were 568 children, or the remainder, who were considered to have whooping-cough clinically, and from 406 of these cultures were obtained of *H. pertussis*. All of these strains have been agglutinated with a serum prepared from a freshly isolated strain, and in this sense are a homologous group. The method of making the medium and the technique of taking cough plates was reported in 1935.[1] As we have not altered our technique no further reference will be made to it. An analysis of the 568 cases of whooping-cough is summarized in Table I. It

TABLE I.

ANALYSIS OF 568 CASES OF CLINICAL WHOOPING-COUGH

Week of disease	*Cases examined*	*Cases positive*	*Percentage positive*
1st	183	173	94
2nd	187	162	86
3rd	102	49	48
4th	55	17	30
5th	23	1	4
6th	15	4	–
7th	1	0	–
9th	1	0	–
12th	1	0	–

is obvious from a study of this table that a very high percentage of positive cultures may be obtained in the first week of the disease. Due to the fact that various persons exposed the cough plates, we believe that this method is applicable for general use.

PART II.

Since our brief report on active immunization,[2] we have had a further opportunity to follow a control series and a group of children who have been inoculated with a vaccine made from freshly isolated strains of *H. pertussis*. Approximately 40 of these children have been inoculated with vaccine kindly sent to us by Dr. Sauer. It is important that a few considerations in the preparation and use of vaccine should be noted. The technique used in the preparation of vaccine from freshly isolated strains is as follows.

Cough plates are selected which contain a large number of colonies of *H. pertussis*. Several of these colonies are picked and spread on slopes of Bordet medium (glycerine potato agar, with 33 per cent citrated sheeps' blood). From this first subculture a heavy suspension in saline is made and mixed with an equal volume of citrated sheeps' blood. This mixture of *H. pertussis* is pipetted into small pyrex glass ampoules in 0.2 to 0.4 c.c. amounts. These ampoules containing the suspension of *H. pertussis* are immediately frozen and dried in a desiccator over calcium chloride under vacuum. After two to three days they are removed from the desiccator and sealed off under vacuum. When a batch of vaccine is made, if no freshly isolated living culture is available, which frequently happens, one of these ampoules of a first or second subculture is opened, suspended in plain broth, and spread on slopes of Bordet medium. From a 72 hours' growth on the slopes, Kolle flasks containing Bordet medium are planted. After 72 hours' incubation at 37° C. the growth from the flasks is carefully scraped off to avoid the inclusion of blood agar particles and is pooled in normal saline. It is not washed or heated. Phenol is added so that the resultant concentration is 0.5 per cent. The vaccine used in the inoculation of children has been made from strains which have not been subcultured in any instance over five times. The density is approximately 15,000 million micro-organisms per c.c. The vaccine has been administered to children in a dosage of 1 c.c. in each arm, with an interval of a week between doses, for four doses, a total of 8 c.c. or 120,000 million bacilli.

Children have been inoculated by a group of physicians and at the hospital's country branch by one of us (N.S.) over a period of five years; other children at the country branch, who for some reason were not suitable for vaccination, have been selected and followed as controls. None of the children in either group had a history of whooping-cough. They have been followed over a one, two, three, four, and five year period by public health nurses or reported upon by a group of physicians in private practice. All of these persons understood thoroughly the

TABLE II.

WHOOPING-COUGH

ANALYSIS OF VACCINATED AND CONTROL CHILDREN

Controls		*Vaccinated*	
Total	355	Total	853
Total followed	161	Total followed	747
Total contacts		Total contacts	
Direct	27	Direct	41
		Indirect	50
Total developed whooping-cough	23	Total developed whooping-cough	2*

* One of these patients had not completed the required inoculation.

exact nature of the problem, and all have very carefully reported their observations. Table II summarizes the results.

From Table II it will be noted that among the 161 control children followed there have been 27 direct contacts, and 23 of these developed whooping-cough. In 14 instances it was possible to take cough plates from these children with whooping-cough and positive cultures for *H. pertussis* were obtained in each of the fourteen. In the vaccinated group 747 children have been followed. There were 41 instances of direct contact in this group and only 2 cases of whooping-cough have developed. It was noted that often this contact was intimate and continuous (*e.g.*, drinking out of the same glass, kissing, playing or sleeping with the child with whooping-cough). On four occasions it was possible to examine the patients who were responsible for contact exposure. In these four cases cough plates were positive. In 50 instances indirect contact (street, school or in play) was reported. In the two children of the vaccinated group who developed whooping-cough one child developed the disease four months following the last dose of vaccine. The other child had not received the complete course of inoculations. Cough plates were not taken on these children.

It has been remarked upon by the physicians who aided in this study that no cases occurred in their private vaccinated group, yet all of them have had an appreciable number of children with whooping-cough in their unvaccinated group. On several occasions they have confirmed their diagnosis by obtaining positive cultures in the latter group. With a personal knowledge of the intimacy of contact in a number of cases we believe that more than 2 children in a total of 747 would have developed the disease if they had not been vaccinated. It is readily appreciated that this study may be open to criticism in respect of a more thorough follow-up study; however it was done as well as could be with the time and funds available.

The results of this study suggest the desirability of continued trials in the use of fresh strain pertussis vaccine for active immunization in an attempt to ascertain if such a procedure may be suitable for general adoption.

PART III.

In our experience the inoculation of cultures of *H. pertussis* into animals has not produced a high percentage of deaths. This finding stimulated us to investigate the possibility of enhancing the virulence of *H. pertussis* in mice with the use of hog's gastric mucin. All mice used in the experiments were from a colony of Swiss mice in which there had been no disease or deaths for a period of at least one year. The mucin used was obtained from the Wilson Laboratories (special granular mucin Type 1701-W). Each batch of mucin was tested for toxicity in mice and found to be non-toxic. In addition the mucin used in these experiments was tested and shown to kill mice consistently with a Type II strain of meningococcus of established virulence. Four freshly isolated strains of *H. pertussis* which had been kept in a dried state in pyrex under vacuum were used. One of these strains had been kept in this state for two years. In preliminary experiments, different "Gates" turbinometer densities were tried. Serial dilutions (1:10) were made in 5 per cent hog's gastric mucin, and two mice were inoculated with 1 c.c. of each dilution intraperitoneally. It was found that a 1 in 10 dilution in mucin from a turbinometer density of 0.7 killed over 80 per cent of mice. A similar dose in broth killed less than 20 per cent of mice. The results of the experiments are found in Table III.

TABLE III.
INOCULATION OF *H. pertussis* (FRESHLY ISOLATED STRAINS) INTO MICE

	Mucin group		*Broth group*	
Strains	*No. injected*	*Per cent deaths*	*No. injected*	*Per cent deaths*
4	190	84	192	17

From Table III it will be noted that 84 per cent of mice were killed when inoculated with *H. pertussis* suspended in mucin, and that only 17 per cent of mice died when inoculated with *H. pertussis* suspended in broth. Consistent results were obtained when cultures were used between the fourth and twelfth subcultures. Thirty-two samples of blood from the heart were cultured from mice dying in the mucin group. Thirty of these cultures were positive for *H. pertussis* and two were contaminated. Twelve similar cultures were taken from the broth group. Eight of these were positive and four were contaminated. It was noted that mice dying in the mucin group did so within a period of 24 to 72 hours after inoculation, whereas

those in the broth group died from 48 to 96 hours after being injected. Recently we have injected mice with an old stock strain of *H. pertussis* suspended in mucin. This old stock strain had no effect on the mice.

From these results it was evident that a large percentage of mice could be killed with fresh strains of *H. pertussis* suspended in mucin. It was thought that such a lethal test might be valuable for testing the protective effect of the fresh strain pertussis vaccine used in vaccinating our group of children. One lot of stock vaccine was selected and inoculated into forty-seven mice. The following doses were injected at an interval of 5 days—0.25 c.c., 0.25 c.c., 0.5 c.c. Two weeks later a final dose of 0.5 c.c. was given. Two weeks after this final dose a group of 50 control mice and 47 vaccinated mice were inoculated with the same dose of a freshly isolated strain of *H. pertussis* suspended in mucin as was used previously. It was observed that in contrast to 88 per cent of control mice only 6 per cent of the vaccinated died when inoculated with a freshly isolated strain of *H. pertussis* suspended in mucin. It is apparent from these figures that the vaccine protects a high percentage of mice from death after inoculation with a suspension of *H. pertussis* in mucin. In this highly artificial type of experiment a useful test may ultimately be evolved, which will serve a practical purpose of assaying the antigenicity of pertussis vaccines in mice.

CONCLUSIONS

1. The cough plate method of isolation of *H. pertussis* is a reliable, practical procedure for general use.

2. The use of an unwashed, unheated, pertussis vaccine made from freshly isolated strains and killed by 0.5 per cent phenol is recommended for continued trials in an attempt to produce active immunization against whooping-cough.

3. A lethal test has been developed by the inoculation of freshly isolated strains of *H. pertussis* in mice, using mucin.

4. Mice vaccinated with fresh strain pertussis vaccine are protected when subsequently inoculated with a living culture of a freshly isolated strain of *H. pertussis* in mucin.

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A PARATYPHOID B CARRIER SUCCESSFULLY TREATED WITH SULPHANILAMIDE*

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GORBAT in 1922 reported a study of 150,000 cases of typhoid fever occurring in the United States over a period of two years, 1920 and 1921. From these there resulted 7,500 "carriers", some of whom were not permanent. It is estimated however that typhoid fever results in a crop of permanent carriers ranging from 3 to 4 per cent.

Koch in 1902 initiated the study of the typhoid carrier by calling attention to the typhoid patient or convalescent as the most serious source of the spread of the disease. Frosch in 1903 first proposed the theory of a saprophytic existence of the typhoid bacillus in the intestinal tract.

Typhoid carriers can be classified as "closed" (bone abscess) or "open" (urine and/or fæces). The gall bladder has been shown to be a nidus of infection in the chronic typhoid carrier, both in the human being and in experimental animals. In the presence of gall stones, either existent before the attack of typhoid fever or developing subsequently, it is next to impossible for the gall bladder to become sterile. Urine carriers clear up spontaneously, and in only about 1 per cent of all typhoid patients does bacilluria continue for as long as two or three months.

* Presented to the Montreal Medico-Chirurgical Society on January 21, 1938.

CASE REPORT

Miss C., aged 55, was admitted to the medical service of the Montreal General Hospital on July 6, 1937.

In November, 1936, she had taken a position as nursemaid to an infant of eight months who was in good health at the time. In May, 1937, the child developed a febrile illness which was identified as paratyphoid B. Stools of all contacts were examined and the patient's stools proved to be positive. Blood agglutination tests were also positive for *B. paratyphosus B* and after some delay she was admitted to hospital for investigation.

The woman was born in England and came to Canada at the age of 24. In England she had suffered from occasional rheumatic pains accompanied by "cold", but had escaped all the diseases of childhood. In 1914 she had quinsy and acute suppurative cervical adenitis. In 1919 had two attacks of erythema multiforme which rapidly cleared under salicylate medication. In 1925 she contracted measles from the children she was caring for. In 1929 she was in hospital with symptoms of gastric ulcer. In 1933-34 she suffered from bronchitis. Since that time she had enjoyed good health. She could not recall any period of illness which was not diagnosed as above detailed.

Since coming to Canada she had been employed as a nursemaid, with short periods as operator in a Kodak shop and saleswoman in a departmental store and confectionery store.

The children in the families in which she was employed suffered from measles, mumps, chicken-pox, bronchitis, pneumonia and acute osteomyelitis. She remained for 14 years in one family and during that period the man of the house developed an illness identified as paratyphoid A. With the exception of this case and that of the infant in her last position (May, 1937) she had not to her knowledge been in contact with any individual with, or convalescent from, any form of enteric fever.

In the medical service careful investigation was proceeded with. Physical examination was essentially negative. Stool examination repeatedly demonstrated *B. paratyphosus B.* Urinalysis and urine cultures were repeatedly negative. Bile obtained by the duodenal bucket on two occasions cultured a pure *B. paratyphosus B.* It was estimated that the colonies numbered 300,000 to 1 c.c. of bile.

There was a moderate secondary anæmia. The blood Wassermann test was negative.

X-ray visualization of the gall bladder was attempted following intravenous administration of iodeikon. The gall bladder was not visualized, but in the gall bladder area there were several shadows suspicious of gall stones.

The patient was transferred to the surgical service and was operated upon on July 22, 1937. The gall-bladder wall was moderately thickened and opaque. There was a stone lodged but not impacted in the cystic duct. Nothing abnormal could be palpated in the structures of the gastro-hepatic omentum; the head of the pancreas was normal. The liver surface presented a slight dimpling suggestive of a mild cirrhosis.

On exposing the junction of the cystic and common ducts the latter was found to be dilated. The gall bladder was removed from the fundus toward the duct. This uncovered an accessory right hepatic duct emptying into the cystic duct close to the junction of the latter with the common duct. The common duct was opened and by the usual procedures two stones were removed from the common duct, one of which was in or close to the ampulla of Vater. A "T" tube was adjusted to drain the common duct. Convalescence was uneventful. The bile drained freely but also passed freely into the intestine. Repeated culture of the draining bile showed a heavy pure culture of *B. paratyphosus B.*

The intern in charge of the dressings developed a severe attack of paratyphoid B. This led to a decision to remove the tube (August 2nd) in order to lessen the danger to the attendants. The patient was considered to be a "liver" carrier and the prognosis bad.

Two days following operation hexamine in increasing doses was administered. The only appreciable effect was an irritability of the urinary bladder. On August 4th sulphanilamide was begun in small doses rapidly increasing to intolerance, as indicated by dizziness, headache and faintness. The administration of the drug was carefully checked by repeated blood chemistry tests to ascertain the blood concentration of the drug, spectroscopic blood examination to determine the presence of met- and sulphæmoglobin, and hæmograms to watch for the development of anæmia and changes in the white cell content. By August 10th the daily intake of sulphanilamide was 90 grains. It was then discontinued because of dizziness, headache and faintness.

The blood concentration of sulphanilamide was 8.6 mg. per 100 c.c. On August 13th and 17th the stools were negative for *B. paratyphosus B.* On August 20th the drug was again administered and reached a daily dose of 60 grains when again there was complaint of headache and heart burn. But as these complaints were not severe the drug was pushed to 90 grains daily on September 2nd, with a resultant blood concentration of 11.8 mg. per 100 c.c. and again toxic symptoms of severe headache and dizziness. Medication was discontinued.

Between this date (September 2nd) and September 30th there were seven cultures of stool, two cultures of duodenal bile, and six cultures of urine, all of which were negative for *B. paratyphosus B.* Patient was discharged, mentally elated! On October 30th and again on December 17th, five months following operation, stools were cultured with negative findings.

During the administration of the drug blood examination every three days failed to reveal any evidence of met- or sulphæmoglobinæmia, nor did any marked change occur in the values of red and white cells and hæmoglobin.

The duration of the period in which this woman has been a "carrier" cannot be surmized. The scant trail of the disease which has followed in her wake is probably due to her life-long habits of meticulous personal cleanliness.

DISCUSSION

Fæces carriers are of three distinct types: (1) liver bile (comparatively rare); (2) gall bladder (common); (3) intestine (exceedingly rare). In the liver and gall-bladder types the bacilli enter the intestine with the bile. In the intestinal type the bile is free from infection.

Differentiation between the bile and intestinal types is effected by the use of the duodenal tube. It is impossible to differentiate clinically the liver and gall-bladder types. In the biliary type cholecystectomy offers a probable cure, especially if gall stones be present. But in the past this procedure has recorded a definite percentage of failures if the biliary infection was not limited to the gall bladder.

The patient reported here had a heavy infection of the liver bile, as demonstrated by a pure culture of *B. paratyphosus B* (300,000 colonies to the c.c. of bile) ten days after a cholecystectomy and drainage of the common duct. On August 2nd the drain was removed, shunting all the bile into the intestine. On August 4th sulphanilamide medication was begun. On August 25th the duodenal bile culture was negative.

"One swallow does not make a summer", nor does this single case definitely establish a method of treatment. But the inferences are plain.

I wish to acknowledge indebtedness to Dr. Edward Bensley, of the Department of Metabolism, for careful chemical analysis of the blood, and to the Department of Pathology for assistance in the numerous cultures of bile, fæces, and urine.

To those interested in the subject I would commend a paper by Allan O. Whipple, of New York, entitled "The surgical treatment of bile typhoid carriers", *Annals of Surgery*, 1929, **90**: 631, from which I have drawn most of my references and dates.

THE PSYCHOGENIC ORIGIN OF SOME ORGANIC SYNDROMES*

BY NORMAN VINER

Montreal

THIS is the presentation of several recent cases, typical of numerous others, wherein similar therapeutic effects were obtained and have persisted for many years. The character of these cases is identical in these respects, that they all presented appearances or evidences of organic disease and that under appropriate "organic" treatment they did not respond; further, that by the psychiatrist they were adjudged to have been of psychogenic origin and under appropriate mental treatment they were more or less completely resolved.

CASE 1

Miss K., aged 23 years, had had digestive disorders for many years. Since July, 1937, she had been under the care of six different physicians, all of whom had suggested and examined her for appendicitis, gastric ulcer, etc. All of them had put her on strict diets. By October she had become very nervous, with attacks of palpitation and trembling. She had lost from ten to fifteen pounds, and towards the end of October had been vomiting after every meal, sometimes the whole meal. She had been belching in an uncomfortable and embarrassing way for many weeks. She became very hysterical, disturbing the whole ward and calling loudly for some doctor to help her. It was now intimated that her troubles were purely imaginary, which roused her resentment and made her worse.

The psychotherapeutic approach is that she is sick, that her troubles are not organic, and that they are not imaginary. This apparent paradox challenges the patient's attention. Her complaint is then called "functional", and the term functional is explained with illustrations: How a group of perfectly normal persons may be sitting at a festive board and barely started, when there is smashing of windows, breaking in of doors, sounds of shooting, and an apparent attempt on their lives. The patient readily understands how under these circumstances there would be trembling, change of colour, loss of appetite, colicky pains, and a dry mouth in which sugar would not melt, and that these symptoms would be real and not imaginary, not organic disease but functional. She is then made to understand that although the above is the result of acute mental stress, chronic and even disguised mental stress can have the same effect, until they have been dug out and eliminated.

Immediately after she is able to take some food, and within 24 hours vomiting has completely ceased. She is told that no food is forbidden to her. The belching soon very markedly diminished. Within a few weeks she had regained 15 lbs. and is beginning to worry about her figure. Subsequent work with her shows innumerable fears, conflicts and complexes which are being progressively dug out and eliminated.

CASE 2

Mrs. K. In October, 1937, a young woman was in a hospital for her second therapeutic abortion, on account of pernicious vomiting of pregnancy. Three days after her abortion has been successfully completed, the vomiting after every mouthful of food or drink was still so intense that she was becoming dehydrated and there were acetone and diacetic acid in her urine.

Psychotherapy is then tried. The patient is told of the incident of a big, strong, healthy man who just after drinking a cup of water from a spring-fed cistern, hears a youngster call out, "Gee, look at the dead rat in the tank." Immediately he begins to shiver, to change colour, to break into a cold sweat, and to vomit immoderately — a complete revolution in the internal economy on hearing a repulsive idea! The patient begins to see that one can vomit without having organic disease, and, without imagining it, that there may be mental issues in the background which work while you sleep, so to speak, creating functional disturbance. Within a couple of hours the patient was able to take and hold nourishment. The psychological problem, at any rate the superficial upsetting factor, was dug out within a few days. It was the disinclination to assume the responsibility and the bother of raising children for a number of reasons which may themselves have been rationalizations that only further investigation could give their real meanings. I do not believe that she need have any more abortions.

CASE 3

Mr. M., a fairly big executive. For many years he had suffered from hyperacidity and pain, and "water brash", all relieved very temporarily by food or by alkalis. He had vomited occasionally, once with a streak of blood. He had been overhauled in various Canadian and American hospitals. Innumerable x-rays have been taken and he had heard frequent discussions about the duodenal cap. He had been under ulcer treatment for several years and thoroughly unhappy with it.

A psychotherapeutic approach showed a wilful, obstinate, quick-tempered man, carrying his business

* A paper read at the fourth meeting of the Section of Psychiatry, Montreal Medico-Chirurgical Society, on December 16, 1937.

to the table and to bed, worrying about details, and very resentful when he could not dominate a situation. A few sessions were required to establish which was the doctor and which the patient, and, after the debating seances had been terminated, the patient soon showed very good cooperation and exceptional insight. His old and his more recent fears having been dissipated, he was enabled to indulge to the full his very good appetite for normal foods. So far a couple of months have passed; he eats well, looks well, feels well, and has gained a few pounds in weight.

CASE 4

Mrs. P., a young married woman who four years ago was found to have a basal metabolic rate of +12 and was under rather sketchy medical care for hyperthyroidism in the interval. About November, 1937, she appeared again and her basal metabolic rate was found to be +28, with a pulse of 120, a flushed face, slight tremor, very slight prominence of the throat, with very definite though restrained tension. She was now consistently treated by the orthodox method of iodine and rest in bed for six weeks without any amelioration.

Psychotherapy was then resorted to, and this approach rapidly disclosed a most dramatic history, with unlimited justification for the formation of a neurosis. In addition the factors at play during the last four years render it almost incredible that there should be recovery unless these factors are liquidated. In spite of that the mere understanding of the situation resulted in an almost immediate drop in the nervous symptoms and a marked reduction in the basal metabolic rate.

CASE 5

A female, aged about 50 years, in a hospital ward. She had suffered from digestive disturbances for many years. Cholecystectomy some years ago did not change these symptoms. Appendicectomy a couple of years later did not improve the health either. Another thorough overhauling in the hospital recently did not tend to mend the situation.

A psychotherapeutic approach with enlightenment of the patient resulted quickly in her having a restored appetite and a marked improvement of the digestion.

CASE 6

Mr. S., aged 52 years, had been failing in vigour for three years. He had fatigability, physical and mental, with transitory losses of memory, faintness, palpitations, and with bowel disturbances. He collapsed in the street and was taken to hospital, with amnesia for this period. He was removed to another hospital, with collapse and amnesia again, on the way. On recovery he could not remember certain essentials of his work. Since then he was afraid to go out alone, for fear of collapsing. Overhauled and under medical treatment for several weeks without improvement. Off work by this time for four months.

Psychotherapy. Enlightenment about the absence of organic disease. Acknowledgment that his symptoms were real and not imaginary. Statement that they were functional, and explanations of the causes along the lines of Pavlov's conditional reflexes and old uneliminated conflicts.

The patient is back at work. He states that he has an understanding of and confidence in himself such as he never had before and above all that he feels fitter than he has for years.

CASE 7

Mr. A., a middle-aged man, had been under medical care for years for hypertension and an occasionally intermittent pulse. He had been overhauled again and again by various physicians and warned about the possibility of a stroke. Reports of the patient are that his blood pressure has varied from 180 to 200 in the past year or two.

Seen by the psychiatrist who felt that there was something real here, as the blood pressure was 220/115, the pulse within normal limits, but somewhat intermittent, the patient quiet but very tense. A routine physical and neurological examination disclosed nothing else. A sedative and salts were given and the patient put at rest for a few days, but little if any change was observed.

Psychotherapy was then tried and in a few sessions the tension disappeared, the blood pressure went down to 180 or 190 and the pulse was definitely less intermittent. By this time the psychiatrist began to be more doubtful as to the organic nature of the cause and became more bold in his approach. The patient after a few weeks lost his fear of a stroke and his interest in the blood pressure. His nervous tension and his intermittent pulse vanished, and for the past few weeks his blood pressure has not reached 160.

If it were not for the limitations of space, similar case histories could be given of diabetics and various other medical and surgical diagnoses. Enough, however, has been indicated in this communication to fortify some views which the writer has held for many years.

Now let us analyze the above reports. We find cases treated as gastric ulcer, and other gastro-enterological anomalies, hypertension, myocarditis, hyperthyroidism, and pernicious vomiting of pregnancy. Most of these cases had been under the care of very good physicians and surgeons for years, yet had received no alleviation of their symptoms. On the other hand a few sessions of psychiatry gave almost immediate relief, lasting for weeks and months, up to the present.

An obvious criticism is that these cases are too recent to draw conclusions from. Not at all. The fact remains that the psychiatrist denied the organic origin of these ailments and did give relief of weeks' or months' duration—so far. Besides, the writer has deliberately chosen cases under present observation that can obviously point a moral to the practitioners who recently had them under their charge. Finally, every psychiatrist, including the writer, might consult his records for innumerable such cases which have stayed well similarly for years.

What the writer has tried to demonstrate is that states of mind have set into motion physiological processes closely resembling pathological processes, and that some of these processes have apparently resulted in a pathological change, in other words, that perversion of function may result in structural alteration, that the mind as prime mover may cause bodily disease. Secondly, that bodily disease, even perhaps to the extent of structural change, can be removed by re-adjustment of mental processes.

To clarify the issue. It is not intended to imply here, for example, that new growths or infections are of mental origin, neither is it denied that organic disease of whatever kind might have a repercussion on the nervous system. But the question does reasonably arise in a great many cases of endocrine or hormone disturbance whether this is not itself due to mental disturbance, *i.e.*, whether we are not attributing malfunction to something that is itself a result of mental maladjustment. This is so important an issue that it merits further elaboration.

By means of benzedrine, ergotamine, ephedrine and atropine, etc., we are able to break into a vicious circle of nervous dysfunction. Useful and valuable as these drugs often are, they should not blind us to the fact that we are not thus getting at the root of the trouble, and that they are mere palliatives unless we also pursue the evil to its mental source. The mechanistic school, disdaining purely mental processes because they cannot be put to the test of experiment or control, have denied or ignored their existence. That is just the point; they have begged the question. If a modicum of the time, effort and money put into modern laboratory research had been devoted to the investigation of the relationship of mental processes to symptoms and manifestations of physical disease, instead of to intermediate products such as hormones a great deal more might have been done to alleviate human misery. Here again let it be emphasized we are not decrying the physical investigation but the neglect of the mental in its relationship to the physical.

There has been no attempt here to be specific about the types of psychotherapy applied. Every variety has been used, and sometimes several kinds in the case of a single patient. Their relative applicability has not entered into the discussion, and, in any case, such discussion is beyond the limitations of this paper.

What, then, is the object of this communication? To show that psychotherapy can cure the disease? That is hardly necessary, now, though this might be an added contribution in that direction. To show that physicians can make mistakes in diagnosis and treatment? So can psychiatrists. The object of this paper is to try to correct a mental attitude—the exclusively organic attitude of the medical profession, and the faulty teaching in which it has its source—an attitude in the humble opinion of the writer that is not conducive to the well-being of a large percentage of the sick and ailing.

In the early Darwinian days there was a great deal of discussion of the relative spheres of mind and matter. A current witticism of the period was, "What is mind? No matter. What is matter? Never mind". Yet, as the evolutionary theory rapidly broke down theological resistance and the scientific approach with its deterministic bent gained sway all thinking was influenced. Not least so was the field of medicine, which was given a materialistic outlook and a research trend. Everything began to be "scientific" and mind, except as a manifestation of matter, ceased to exist. All syndromes, mental as well as physical, became manifestations of organic disease. Such symptoms as could not thus be disposed of were relegated to the imagination, to malingering (to "possession", in a few rare cases), or to heredity, which, again, implied an organic basis. In short, mind was legislated out of existence.

Physicians, as a class, are no more philosophers than are mechanics. Rules of thumb were laid down for them. The voice of authority, the high mandarins, who knew no better, continued to lay down the law to generation after generation of students, who absorbed the dictum, and didn't or couldn't question. But facts cannot for ever be eliminated by proclamation.

To say nothing of popular delusions and shrine cures, two new schools did arise about a generation ago, which went to the opposite extreme—that matter didn't matter and that all disease processes were due to mind. Of course, I am referring to the Freudian and the Christian Science schools. The Freudian school at first would have implied that most diseases were the result of maladjusted mental processes, and the Christian Science school that matter doesn't exist and disease is a mere figment of the imagination. Of course these ideas were received with derision, and an occasional portly neurologist would almost froth at the mouth as he would relate how one psychoanalyst stated that disseminated sclerosis could be cured by analysis, or that another had tried to psychoanalyze a case which had turned out to be a tumour of the brain. Quite so. Which all goes to show that there can be no stability or balance at either extreme. But, year by year, these Freudians and these Christian Scientists continued to cure or re-establish numerous in-

dividuals who had for years remained in the hands of orthodox practitioners, with the aid of all the appurtenances of medical science, and who had provided them with fine organic diagnoses but no help. This after some years gave many thoughtful physicians "furiously to think", so that in the past decade we begin to see numerous papers from clinicians who refer to functional imitations of real disease, the neurotic element in creating physical symptoms, and, above all, the desirability of studying the whole personality in order to correctly evaluate symptoms. So real is this change of front becoming that at the meeting of gastro-enterologists in Atlantic City last June it was stated that you can literally think (or worry) yourself into gastric ulcer. Still more impressive was the editorial in the October 23rd issue of the *Journal of the American Medical Association*, entitled "Psychotherapy in gynæcology and obstetrics", in which the following remarks appear: "Such symptoms as leukorrhœa, dyspareunia and frigidity, vaginismus, dysmenorrhœa, hyperemesis gravidarum, pseudo-cyesis and even amenorrhœa and menorrhagia, often have their origin in psychopathological states." Just imagine such a statement from such a source ten or fifteen years ago!

Psychiatry, a generation ago, when "none were so poor as to do it reverence", began to raise its head with Adolf Meyer, who bought its way into organic medicine by the dogma of the "integration of the whole personality", thus allowing of its ingress into polite society. I feel that with accumulating recognition the shoe is now on the other foot, and psychiatry might with justice dispossess organic medicine of a large part of the domain it hitherto held exclusively as its own.

The lag however is all too manifest in the teaching sphere. The veterans who die but never surrender still inculcate the old doctrine and still bring up generation after generation of students in the strict implications of organic causation, so that the latter can only learn by years of trial and tribulation that mind as well as matter can cause physical disease.

The writer would presume to suggest that since, excluding the psychoses, possibly half of all human ailments are due to mental sources a disproportionate effort and emphasis are directed towards organic teaching, since no practitioner can be well-balanced unless he understands mental influences in disease. Since modern psychiatric teaching is directed mainly to the psychoses and to some extent to the neuroses, a proper training in, call it psychophysiology or psychopathology, is as essential as is that in medicine or surgery.

DISCUSSION

DR. LEHMANN.—The relationship existing between the emotional states and organic disease is very well recognized in Germany. Our professor of medicine teaches that gastric ulcer is caused by emotional vagotonia and demonstrates the production of histamine resistive achlorhydria of the stomach following a hypnosis with suggestion. It is also recognized that the iodine concentration in the blood increases after experimental emotional experiences. The dermatologists in Berlin no longer use drugs or local applications in the treatment of warts since hypnotism has proved to be the most effective and rapid treatment.

DR. HEBB.—Would you be inclined to separate your cases into two groups, the endocrine and the gastro-intestinal?

DR. PATERSON-SMYTH.—Is it not that psychiatrists sometimes swing too far? Many of these patients are organically ill and one must treat them as such as well as from the psychiatric point of view. We could expand the discussion to a consideration of the secondary psychiatric effects of those who have definite organic illness. The autonomic fibres and tracts of higher centres may be of great importance in these problems.

DR. DANCEY pointed out that in England particularly several general practitioners have specialized in this work and their published reports and viewpoints coincide very closely with the speakers. Some of these men used various psychotherapeutic approaches but Dr. Ross in his recent book stresses the need for simple repetition and reeducation.

DR. REED was of the opinion that the psychiatrist can best impress groups interested in other branches of medicine by clearly presenting case reports demonstrating the need for a consideration of "The patient as a whole" and the value of such methods. With regard to this the general practitioner was more adept than specialists. The latter so often not only omitted psychiatric factors but others as well. Too often surgery was done or medicinal regimens prescribed in the vain hope that the mental symptoms were just a result of a physical letdown. The difficulty in really covering the field was the economic cost and the lack of trained psychiatrists available. The need therefore was to interest the medical undergraduates in the subject of his patients as individuals requiring individual consideration.

DR. PORTEOUS was of the opinion that the speaker had made his point, but perhaps too clearly and too emphatically. There is no possibility of separating entirely the organic from the psychic or *vice versa* and both are of importance in each individual case. The general practitioner is not always or even often unaware of this fact since he is called upon to recognize the situation daily in his practice. It is probably because we, as psychiatrists, see the therapeutic failures that we forget that many cases recover in the hands of the practitioner and we never see them.

DR. VINER.—I may say that I have not found vomiting a particularly resistive symptom. In the cases quoted, the patients were retaining food within a few hours and gaining weight within a week. Dr. Hebb's question regarding the systemic classification of such patients is a difficult one. Certain it is that the majority of the complaints concern the digestive tract but the "focal point" is by no means limited nor would I stress hormone imbalance to the exclusion of other mechanisms.

THE X-RAY THERAPY OF ACUTE INFLAMMATORY DISEASES*

BY R. WALLACE BOYD, B.Sc., M.D., C.M.

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"A question which has been recurring in the minds of some during the past few years is this: does the medical profession in general and the radiologist in particular realize and appreciate the remarkable value of roentgen therapy in the treatment of acute inflammations and infections, almost regardless of cause, nature, location or extent? I am inclined to believe that they do not, because little note is made of this treatment in even the most recent textbooks, and only infrequent and limited evidence of it is to be found in the index of the medical literature of this country".

(Excerpt from an editorial by the late Willis F. Manges[14] in a recent issue of the *American Journal of Roentgenology and Radium Therapy*).

DURING the past fifteen years very rapid progress has been made in the study of radiology, particularly in regard to the effects of the roentgen ray on various pathological states. Until 1920 practically all the research in this work was centred upon the response of malignant tissue and skin diseases to irradiation. Since then more and more attention has been paid, chiefly by European workers, to the influence of the x-ray upon acute inflammatory lesions. We intend to discuss the fundamental physical and biological factors involved in the radiotherapy of inflammatory lesions. Later we shall review the diseases most amenable to the roentgen ray, as observed by the leading workers within the past few years.

RADIATION PHYSICS

When we generate a direct electric current and pass it across a gap between two electrodes in a highly exhausted glass tube, using a force of some 60 to 200,000 or more volts, electrons or the absolute "atoms" of negative electricity flowing in the conductor are thrown at a high speed across the gap and strike the heavy metallic anode. Upon striking the metal the direction of the electron is suddenly altered and the deflection of it causes an electromagnetic x-ray wave to start from the point of impingement and travel outwards from it in all directions. As an analogy, let us recall our schoolboy lesson of the pebble striking the surface of still water, thus causing circular waves to radiate out from the point where the direction and force of the stone were suddenly altered. The wave length is the distance from one wave crest to that adjoining it. The shorter the wave length, the greater is the frequency or speed of the waves. This wave motion is a characteristic of the x-ray and occupies a place in the great electric wave spectrum, along with gamma, ultra-violet, visible light, infra-red and radio waves. The general properties of all these wave motions are the same, although the wave length of an x-ray is about five thousand times shorter than that of visible light.

When the x-ray beam strikes matter it penetrates through the substance to varying distances, depending upon the speed of the ray and upon the consistency of the substance. If the material is of such a character or dense enough the progress of the whole ray is eventually stopped. The arresting of the beam in matter is termed absorption, and it is upon this phenomenon that the ultimate effect of the x-ray upon the living substance depends. Our present knowledge of the mechanism of absorption of an x-ray is the outcome of the atomic theory of the structure of matter. The final minute particle of the molecule of any matter is the atom. It is the smallest quantity of an element that can exist and still retain the chemical properties of the element. The atom seems to consist of a minute central nucleus in which practically all the mass of the atom is concentrated, and of surrounding electrons which speed around the nucleus in definite orbits. The nucleus is positively charged, the amount of charge corresponding to the atomic number of the atom in the periodic scale. In the neutral atom the surrounding negative electrons are equal in number to the positive charges on the nucleus. The number and arrangement of these electrons determine the physico-chemical properties of the atoms and the matter consisting of them.

When the electromagnetic oscillation from an x-ray tube pierces any substance certain changes occur in the atomic unit of the matter. The

* A paper read at the Annual Convention of the Canadian Medical Association, Alberta Division, at Edmonton, September 9, 1937.

wave strikes certain electrons moving in their orbits, and the energy so imparted forces these electrons from their orbit into an adjoining orbit of their sphere. The electron may be pushed from its orbit to fly into space between the atoms or become incorporated into the orbital path of an adjoining atom. Each time an electron's movement is altered by the x-ray, a new or secondary wave of a more feeble nature is set into motion at this point. This wave travels through the substance, striking other electrons, which in turn generate tertiary waves, and so on until all the energy incorporated into the original wave has been used up. Thus by the liberation and re-arrangement of electrons, the atoms are split into positive and negative ions. The radiation transfers the electrical energy from the tube to the tissues and causes an ionization of the atoms.

RADIATION BIOLOGY

The manner in which the energy of radiation and the ensuing ionization becomes biologically effective is not definitely known. The direct bombardment of the atomic structure of protoplasm by the electrons and their release therefrom results in the rearrangement of the atomic electrons and the production of some chemical change. This influences the life of the cell, or, in other words, the primary reaction is a physical one, which produces a chemical process, which in turn initiates the biological change. Much has been written about the many complex chemical and colloidal changes occurring in irradiated tissues, but all the altered metabolism due to the absorption of radiation is summed up as the biological effect of the roentgen ray. In 1904 Bergonie and Tribondeau formulated a law, well known to most medical men, which is the basis for the established usage of radiation as a therapeutic measure. The law states, "Immature cells and cells in an active state of division are more sensitive to radiation than are cells which have already acquired their adult morphological and physical characters". It is believed that the unstable metabolic state of the protoplasm of the embryonic and actively dividing cells renders them more sensitive and responsive to the physiochemical influence of the roentgen ray than are the fully grown adult or mature cells.

The sensitivity coefficients of the tissues are given, assuming that of the skin to be one. Note the marked radiosensitivity of the leucocytes as compared to other tissues.

TABLE I.

THE RELATIVE SENSITIVITY COEFFICIENTS OF NORMAL TISSUES TO A RADIATION OF MEDIUM HARDNESS, HIRSCH.[7]

Leucocytes	*Dermal structures*
2.5 lymphocytes	1.4 hair papillæ
2.4 polymorphonuclears	1.3 sweat glands
Germinal cells	1.2 sebaceous glands
2.3 ovarian	1.0 skin
2.2 testicular	0.9 serous membranes
Blood forming organs	*Viscera*
2.1 spleen	0.8 intestines
2.0 lymphatic tissue	0.7 liver
1.9 bone marrow	0.6 pancreas
Endocrines	0.5 uterus
1.8 thymus	0.5 kidney
1.7 thyroid	*Connective tissue*
1.6 adrenal hypophysis	0.5 fibrous tissue
Blood vessels	0.4 muscle
1.5 intima	0.4 fibro-cartilage
	0.3 bone
	0.2 nerve tissue
	0.1 fat

EFFECT OF RADIATION ON INFLAMMATORY CELLS

We are now prepared to review what happens when the x-ray beam traverses a tissue in which there is an early acute inflammatory process. The classical clinical findings of inflammation are all well known, but as the effect of radiotherapy is primarily upon cellular activity it is best to consider first the main cellular phenomena of inflammation. The cellular processes involved are: (1) mobilization of the polymorphonuclears and lymphocytes from the blood capillaries into the area of tissues where the irritant lies; (2) the proliferation of the neighbouring cells of the reticulo-endothelial system to form its phagocytic elements; (3) the change of the fixed connective tissue into phagocytic cells. All of these newly formed cells have a short, intensely active life, with a view to counteracting the effects of the irritant and its ultimate disposal. Such cells, as will be noted in the table of sensitivity coefficients, are highly radiosensitive, and they can be greatly affected by light doses of irradiation which has comparatively little effect upon the adjacent healthy tissues. There is considerable evidence, such as demonstrated by Isaacs[10] to show that light doses of x-rays speed up the life cycles of the white cells tremendously. The time for a white cell to change from its embryonic undifferentiated stage to an adult cell, carry out its functions, and eventually die, is shortened by irradiation into a few hours. Hence, the radiosensitive inflammatory cells are matured faster, antibody formation and phagocytosis are accelerated, and

the result of this is a hastened resolution or localization of the inflammatory process. Because inflammatory cell growth and actions are measured in terms of a few hours and their functions are taken over by a new crop of younger cells repeated light doses are considered necessary, so that the newer developing leucocytes are also affected, that is, brought to early maturity. Thus, because of this effect on the cells of inflammation, treatments must be administered as early as possible, frequently repeated, and the doses should be light.

There have been certain workers who believe that the therapeutic effect is due to the actual destruction of the leucocytes. Warthin[18] found a rapid destruction of lymphocytes, almost in an explosive manner, within fifteen minutes after irradiation. It does not seem logical to kill leucocytes which are the protective mechanism against an infective process, but some investigators consider that the early destruction of these cells must more rapidly provide adequate amounts of vital substances, ferment or antibody, which are contained within the leucocyte and are liberated for defensive processes after its death. Desjardins[1, 2] has discussed the subject very fully in several of the American journals and other periodicals. In an early paper (1931) he compiled the results of roentgenotherapy of inflammatory diseases of one hundred European and American workers. He shows that by the destruction and disintegration of lymphocytes in an inflamed area local pressure is relieved, and, with easing of pressure, pain is alleviated. His findings have been of great value as a guide and basis of subsequent investigation. As most therapeutic doses now used in early acute inflammatory lesions appear too small to destroy the leucocytes it would seem that the benefits derived are due to the acceleration of function of the leucocytes rather than to the result of their death. It may be possible that the effect is due to a combination of increased activity of the living cell and its destruction which is somewhat hastened by the quicker completion of its life cycle.

Broadly, the chief beneficial effects noted after irradiation are either a more rapid resolution of the lesion with decrease of the swelling and pain without suppuration in early cases, or a more rapid localization and a lessening of suppuration if necrosis has already commenced. Treatment after extensive tissue necrosis and abscess formation has little effect upon the subsequent course, other than possibly an increased leucocytic activity in the peripheral zones of the inflamed area, and therefore a possible earlier termination.

CLINICAL APPLICATION

Until 1925 reports of inflammatory lesions treated by x-rays were few and inconsistent. Almost every type of lesion had been treated, and there were as many techniques and opinions of the treatments as there were radiologists using them. Now with a greater knowledge of the biological effect, standard world-wide means of measuring and describing dosages, vast improvement of technical factors, and early application of treatment, radiologists are having uniformly good results. The treatments offer little inconvenience to the patient. The modern supervised radiological departments of hospitals have facilities for treating bedridden patients with practically no discomfort to them. The fear of the so-called burns, reactions, radiation sickness and other constitutional effects is groundless, as the total dose administered is often less than that which was used for a single radiographic exposure up until recent years.

The credit for having created general interest in the radiotherapy of inflammatory conditions goes to two German workers, Heidenhain and Fried, who in 1925 proved its value on 1,500 cases and placed it on a scientific basis. Many other European and American workers, their cases numbering several thousands, have since confirmed the fiindings of these men. A few of the more recent results are given here mainly to show the diversity of lesions that can be successfully treated by present day methods.

Friedman[4] treated over 1,000 cases of acute superficial inflammation consisting of cellulitis, lymphangitis, adenitis, carbuncles and furuncles. Curative results were obtained in early cases, and there was shortening of the clinical course of the more advanced. Results from small doses were evident within twenty-four hours, and healing occurred spontaneously when suppuration was not already present. May[15] had 235 patients with 19 distinct types of inflammation, which showed marked improvement in 80 per cent, the others being doubtful or negative in reaction. Garland[5] reported 30 cases of acute gonorrhœal arthritis involving 80 joints. Small twice-weekly doses were given for two or

three weeks. Many patients were bedridden with pain and acute general symptoms. Ninety per cent were much improved, and half of these patients were cured within a few weeks of the end of treatment. The rest improved gradually, but, while free of pain, had some stiffness or disability in the involved joints. Certain joints were left untreated in five patients as controls. These joints showed no improvement. At present pyrotherapy is a fairly popular remedy for this disease. Because it is contraindicated in patients with cardiac disturbances, arteriosclerosis, nephritis and has unpleasant by-effects, Garland believes roentgen therapy is unquestionably superior. Hodges,[8, 9] has had success in the treatment of erysipelas, furunculosis, carbuncles, granuloma, parotitis, and particularly the local acute infections about the head and neck. Perhaps the greatest usefulness of roentgenotherapy is in the treatment of potentially serious infections of the lips, nose, cheek, and, to a lesser extent, of the extremities. Hodges has been a most ardent advocate of this type of treatment, and his results with a large number of lesions substantiate his beliefs.

McKee and Ball[13] treated over 600 cases of acne in its several types and various stages by radiation alone. Fifty per cent were permanently cured, the treatment extending from six weeks to four months; 45 per cent improved, and 5 per cent failed to respond. They conclude that radiotherapy for acne, both from a statistical and clinical experience, offers the most certain method of obtaining a clinical cure, especially when combined with adequate general medical attention.

Lucinian[12] recently reported 50 consecutive cases of otitis media (31 acute, 8 subacute, 11 chronic) in which roentgen therapy was given over the ear and mastoid area. The treatment was consistently followed by relief of pain, increased discharge, improved hearing and amelioration of the systemic manifestations of the disease. None of the acute cases developed mastoiditis or perforation of the drum, and none required tympanotomy. Mastoiditis was already present when the rays were applied in 9 cases, 2 of which later required mastoidectomy. Of the acute cases 12 required only one treatment, and 18 had two treatments for complete relief. Early roentgen treatment obviated, apparently impending perforation in 4 cases, and in 3 mastoidectomy became unnecessary after operation had been seriously considered. In a series of 25 unselected cases of acute and chronic otitis media in which roentgen therapy was not applied, perforation of the drum occurred in 5, mastoiditis in 9, and mastoidectomy had to be done in 5 and tympanotomy in 11. These findings are strongly supportive that roentgenotherapy shortens the course of the disease and prevents complications. In no treated case was a deleterious effect observed. Granger,[6] Ross,[16] and Schillinger[17] have also had excellent results within recent years in their treatment of ear infections by radiotherapy.

As for carbuncles, Firor,[5] has had 56 cases in which early irradiation was carried out. All except one healed normally with an occasional lancing of a pointing abscess. There is a remarkable tendency towards localization after x-ray treatment, so that the more radical surgical steps such as excision are seldom necessary. Levin[11] concludes that irradiation is especially satisfactory in children and reports favourable results from roentgen treatment of the acute infections, particularly acute lymphadentis and mastoiditis. As for our own experience, we have no large series of cases to quote in this paper, but we have seen a number of patients with acute superficial inflammatory lesions of the face and extremities successfully treated. We have had selected early, acute cases of mastoiditis, pharyngitis, tonsillitis and sinusitis, particularly in children, treated in hospitals where their clinical course was carefully watched. There is no doubt in our mind as to the real value of radiation in ameliorating or curing these diseases.

In regard to the actual technique, involving as it does the many mechanical factors, duration, frequency, intensity and filtration of doses, we may only say here that practically all radiologists have at last agreed upon the general type of procedure to be used. The treatment must be started early, and the radiologist should have the patient continually under his observation. The treatment must be individualized, that is, the selection of cases and doses to be used is an individual problem and is not a matter for empirical methods. Success depends greatly upon the collaboration of the physician or surgeon and the radiologist. Radiotherapy does not supplant either medical or surgical needs, as both are required when their respective indications appear. The success of x-ray treat-

ment depends to a large measure upon the clinical ability of the radiologist. Besides knowing the physical properties and limitations of his therapeutic armamentarium the radiotherapist must fully understand the pathological processes under his care. Just as the physician before prescribing treatment carefully considers the personality, the general health and the local disease of his patient, so too the radiologist must estimate these factors accurately before commencing radiotherapy. We can hardly expect the general medical practitioner to put his patient in the hands of a radiologist unless the radiologist has a fair clinical knowledge of the disease he is asked to treat. The qualified radiologist of today is not just a "button presser"; he is primarily a physician, a clinician specializing in radiology, and none other should enjoy the confidences of his referring physicians and surgeons.

In conclusion, the clinical value of radiotherapy of inflammatory diseases has been definitely proved. The underlying reasons and theories for its use are fundamentally sound. It is a convenient type of therapy which should be readily available to all patients. The treatment of inflammatory lesions is only one field of endeavour of the radiotherapist, but it is a satisfactory one because of the almost phenomenal successes. It is one of the new physical therapeutic measures which is rapidly attaining its rightful place along with surgery and internal medicine.

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EYESTRAIN

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AMONG the commonest symptoms met with in the day to day practice of ophthalmology are those of eyestrain. And all too frequently the results of treatment are disheartening. This is because, as a rule, the treatment adopted is based on a faulty appreciation of the physiological background of the condition. By "eyestrain" is not meant here the temporary production of symptoms by over-use of the eyes under adverse conditions, but, rather, those ocular, visual and systemic manifestations occurring under normal circumstances. The former are of short duration and are relieved by removal of the irritating conditions; the latter are chronic and give rise to much more disturbance. Another term for eyestrain is "asthenopia", a poor one, because, as we shall see, eyestrain is not due to poor vision. Stutterheim's word, "asthenoconvergence", would seem to be preferable, as it takes note of the physiological principles underlying the condition.[1]

For many years three possible causes of eyestrain have been studied without, indeed, giving much help in the treatment. The first of these is errors of refraction. It is well known that large errors of refraction are as a rule not associated with symptoms of eyestrain; a small error only is present, an error of such a small

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degree that vision would be called normal, were it not for the symptoms present. The perfect human eye, from the optical standpoint, is unknown. Why, then, if all persons have some small refractive error do they not all manifest symptoms of eyestrain? It is obvious that refractive errors cannot be the sole or even the most important cause.

The second is accommodation, which also has been studied without shedding much light. Small disturbances are rare and cause little or no trouble; large ones are more common and have their origin in some systemic disorder. For all practical purposes faulty accommodation can be discarded as a cause.

Thirdly, more success has followed studies on the static muscle balance of each eye in relation to that of the other, that is, the muscle balance of the eyes at rest. These imbalances have been grouped under the title of "heterophoria".

Recently, attention has been called by many, and by Stutterheim[1] in particular, to a fourth cause, the kinetic or dynamic relationship of the two eyes working together. A small amount of static imbalance can be tolerated without any symptoms, but when associated with a dynamic imbalance the situation assumes much greater importance. In a very large number of cases marked dynamic imbalance exists without heterophoria. Hence, it would seem that though heterophoria is important it does not hold the key position that dynamic imbalance does.

As Stutterheim[2] has pointed out, to understand this factor of dynamic binocular relationship it is necessary to recast our ideas of the function of the extraocular muscles in the light of the new physiological knowledge. The movements of each eye are coordinated with those of its fellow in such a way as to keep each visual axis always pointing at the observed object. The most important of these coordinated movements is convergence. At rest the anatomical position of the eyes is one of slight divergence, so that in looking even at distant objects some convergence has to be used. Thus all ocular movements have an underlying basis of convergence. This power of convergence is, phylogenetically, a new function. It is found among felines and simians but reaches its highest perfection in man. The recent researches of Brouwer[3] have shown that its development has gone hand in hand with the appearance of a convergence centre in the brainstem. This centre is composed of an unpaired group of ganglion cells lying along the median raphe between the nuclei of the third nerve. Its close association with the third nerve nuclei controlling the superior recti, internal recti and inferior obliques, and the fourth nerve nuclei controlling the superior obliques (all muscles involved in convergence) is anatomical evidence of the importance of its function. It should be noted that this function of convergence is unconscious and autonomic. As an object is brought nearer the eyes the visual axis tends to move to the edge of the fovea. This sets up a reflex through the convergence centre which immediately brings both eyes into proper alignment again. This action is separate and distinct from that which can be brought about actively from centres in the post-central gyrus; it is entirely reflex and autonomic. The textbooks commonly connect convergence with accommodation. It is true that these come under the head of what are called in physiology "associated movements", but, actually, they are largely independent of each other. This can easily be proved by making a patient converge by putting before his eyes prisms, base out, while he is looking at a distant object and thus has his accommodation at rest. Indeed, as we shall see shortly, this linkage of convergence and accommodation in some cases is too strong, and when this happens esophoria results.

Experiments, based on those of Sherrington, which were carried out by Stutterheim[4] have thrown more light on the subject. The muscles of the eye act constantly as elastic tensors. We do not find the extraocular muscles obeying the law of reciprocal innervation (Sherrington[5]) as do the muscles of the limbs, for instance. In the latter when nerve impulses go to one group of muscles, causing them to contract, nerve impulses go also to the opposing group, inhibiting them. Unlike this, the extraocular muscles can only act by contraction. When one of these contracts it does so against the elastic stability of the opposing muscle or muscles. Another point of equal importance is that when the eye comes back to its primary position the muscles that were contracting relax, but not completely. An elastic pull is still maintained. The primary position, then, is not brought about by the muscular pull of the opposing group of muscles, or by the flaccidity of all the muscles, but by the elastic stability produced by all the muscles,

acting together. It is not difficult then, to understand the disturbances set up by any fault in the correlation of the extraocular muscles. As the largest and most important group of muscles is involved in convergence any disturbance in their function will be most likely to cause symptoms—that is, eyestrain.

Elshing[6] measured the power of convergence in a series of normal people and found it to be in the region of 50° (actual angular degrees). Stutterheim repeated this work and confirmed it. Moreover, he has found small differences among normal human beings and between different races. The negro, for instance, has a convergence power of about 40°. Whites, with a highly developed critical visual sense, have a more highly developed power of convergence than those less favoured. This again is a proof of the importance of this function for the full efficiency of the eyes. A very large proportion of those suffering from eyestrain are found to have a deficiency in convergence. This may be of small degree, but it is sufficient to cause strain under the conditions of modern life.

The limit of convergence, which is an index of convergence power, can be measured by putting before the patient's eyes a series of prisms, base out, while he is looking at an object twenty feet away. In cases of eyestrain convergence power will often be found to be as low as 20°. Convergence power can also be measured on a Major amblyoscope. A small amblyoscope can also be used. The cause of the deficiency of convergence does not lie in the muscles but in the nerve reflex pathway governing them. It is a well established fact that phylogenetically new functions are apt to be unstable. They are also more receptive to training. The same is true of convergence. Facilitation of the nerve impulses (the *Bahnung* of the German authors) can be brought about by training. The treatment of deficiency of convergence should be directed to this end.

With regard to the symptoms of eyestrain most of them are almost too well known to need mention. They can be dealt with under three heads.

Ocular symptoms.—Here may be included several well known symptoms, the most important of which are dull heaviness of the eyes, itchy and burning sensations in the margins of the lids, and sometimes redness of the bulbar conjunctiva.

Visual symptoms.—More or less prolonged attacks of blurred vision are not uncommon. There may be periods of diplopia. Sometimes these are so persistent as to incapacitate the patient for work. Probably one of the commonest but least often recognized symptoms is amblyopia, which is usually of a minor degree. It is not uncommon to find these patients unable to see more than $\frac{6}{9}$ or $\frac{6}{7.5}$ in spite of the most accurate correction of the refraction. Less frequently the visual acuity may be much poorer. The exact mechanism of this is uncertain, though it probably falls under the head of a partial macular suppression. Stutterheim[2] has recently noted several cases in which the peripheral field was uniformly contracted. This may be of minor degree, but in one of his cases it was so marked that it amounted to tubular vision.

Systemic symptoms.—The close anatomical relation of the convergence centre and the nuclei of the third and fourth nerves to the hypothalamus makes it not surprising that systemic symptoms should be wide and varied. Faintness and vertigo are not uncommon. Certain forms of sea- and train-sickness come under this category. Lack of attention and somnolence in school children may be a feature. Certain vague symptoms such as loss of appetite and gastric disturbance must be included here. Migraine, with its cause lying probably in an intracranial vasomotor disturbance, should also be placed here. That all these may be caused by static and dynamic muscle imbalances is shown by the fact that treatment on this basis is very efficacious.

Treatment should be marked by care and patience. The patient should be accurately refracted. Glasses should be supplied if necessary, with modifications in certain cases which will be dealt with in a moment. The eyes should be tested for static muscle balance, that is, for any heterophoria. All errors should be carefully measured with the Maddox scale for distant vision and the Maddox wing test for near vision. These give more accurate readings than do the tests carrier out with prisms. Finally, the dynamic muscle balance, that is, the power of convergence, should be tested. This can also be done with prisms, but more accurately with one of the Major amblyoscopes.

We shall deal with the treatment of static and dynamic muscle imbalance together, as

they are closely related; also, because by building up counteracting forces in the latter we are able to correct the former. In the treatment of these conditions the Major amblyoscope, particularly the orthoscope as devised by Miss Pugh, is of inestimable value. The exercises and tests on this instrument as elaborated by her[8] are extremely efficacious.

If there be a heterophoria of any degree it should, of course, be treated. The most common and, fortunately, the most easily dealt with is an exophoria. This is frequently associated with a convergence deficiency, though the latter may be present without the former. The treatment of both conditions is the same, for as the power of convergence is built up the exophoria will disappear. With a Major amblyoscope the test objects are adducted until fusion breaks, and then abducted until fusion is restored. The point at which each occurs is noted. Gradually fusion can be held with greater and greater adduction. At first convergence should be assisted by making the patient accommodate. Stutterheim[2] treats these patients by making them hold fusion against increasingly powerful prisms, base out. As a Major amblyoscope is an expensive instrument this will probably be the more available treatment and it is quite effective. While this treatment is carried out daily, the patient should have home treatment of not more than fifteen minutes twice a day with a Holmes stereoscope and graded slides used on the same principle. If the patient has hypermetropia of any degree he should be undercorrected, if anything, at first. Later, fuller correction can be given. Myopic patients are more comfortable with full correction as this allows them to use their accommodation to aid convergence.

Esophorias are somewhat less common but more difficult to deal with. An attempt should be made to break down the convergence accommodation linkage. First, if there is any hypermetropia the fullest possible correction should be given. In severe cases the full atropine correction should be prescribed, not even making the usual allowance for "tone". If the patient is allowed to get used to his glasses while still under atropine he will as a rule tolerate it. Myopic patients with esophoria are often more comfortable with a reading correction for close work. Then, with a large amblyoscope abduction should be built up. Home treatment with the Holmes stereoscope and graduated slides should also be instituted. One pitfall should be avoided in these cases. Static muscle balance tests should always be carried out for both distant and near vision. An esophoria for distant vision and an exophoria for near vision is a sign of a deficiency in convergence. Such cases should be treated as previously mentioned under exophoria.

Vertical "phorias" are the least common and the most difficult and unsatisfactory to treat. Attempts at building up a better balance can be made with the amblyoscope. This can also be done by exercises, using prisms of increasing strengths. But care should be exercised in prescribing prisms as they tend to aggravate the condition, necessitating the use of increasingly powerful prisms.

It should be remembered, too, that temporary muscle imbalances are not uncommon after debilitating diseases. In such cases a waiting attitude and the prescription of a good tonic are called for. Sometimes, when symptoms are very persistent, particularly following influenza, after a reasonable period treatment on the above lines should be instituted. Treatment based on these principles, carried out with patience and persistence, will be found very successful. Indeed, in cases where there is only a small error of refraction full vision with no symptoms will be acquired without the use of glasses.

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FRACTURED PATELLA

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TO be well founded any operation must be done in the light of exact anatomical and physiological facts. That the patella is an unnecessary adjunct to the knee joint seems to have been clearly proved, but to depart from orthodox treatment to the extent of removing the patella in case of fracture of that bone, in preference to the time-honoured custom of wiring, one must be very certain that the new treatment, involving the removal of the bone, will not in any way destroy the usefulness of the limb. Gray's anatomy states that the uses of the patella are: (1) to protect the front of the knee joint; (2) to increase the leverage of the quadriceps extensor by making it act at a bigger angle. One has only to glance at the position of the patella in any textbook on anatomy to see that the front of the knee joint is by no means protected by the patella, since it covers it only in part. A vast number of experiments have been done to prove or disprove the second hypothesis. This I am not going to deal with, except to quote in part Brook, in the April, 1937, *British Journal of Surgery*, who concludes: "The patella has been adapted to play a part in the movements of the knee joint, but was not designed for this purpose, and although, theoretically, its presence should enhance the power of the quadriceps muscle in practice there is considerable doubt as to its mechanical value in assisting movement at the joint; rather, there is evidence that it has become imperfectly adapted to the mechanism of the joint, and thus has a deterrent action on a machine for which it was never designed."

It appears likely that the patella is in progress of undergoing retrogression in human beings, much after the fashion of the fibula. This was pointed out by De Vries as early as 1900. That it further is a deterrent is suggested by the fact that the slower moving animals have large, well developed patellæ, while rapidly moving animals, as the cat tribe, have a very small one, and the kangaroo none. I also have knowledge of a coal heaver who worked daily, despite the fact that after a fracture of the patella the two halves were seven inches apart, no difference being noticed in the power of the two legs.

Referring to the plates in Gray's anatomy, it will be seen the quadriceps tendon passes over the patella to become continuous with the ligamentum patellæ. There is an attachment at the front of the patella, but not to the top or bottom; there the spaces are filled in with fat, more noticeable at the lower border of the bone, as shown in the plate referred to. This is of great importance, because if the patella interrupted the continuity of the quadriceps, the tendon repair after removal would have to take into account filling in the gap some way, as by splicing or other device. The lateral expansions of the two vasti are usually torn across at the same time the patella is fractured, and their repair is as necessary to the function of the joint as is the repair of the quadriceps extensor proper.

CASE REPORT

My patient was a male of 59. On October 16, 1937, he fell while riding. Many bruises resulted, but his major injury was a transverse fracture of the left patella. He was admitted to the hospital the same day, and was seen by me the following morning, x-rays having been already taken. The skin over the knee was badly discoloured and the joint puffed up, obviously filled with blood. An immediate operation was done. Dr. Meredith gave him a spinal anæsthetic using 150 mg. of neocaine. A tourniquet was applied about the leg well above the knee. The skin incision was longitudinal, five inches in length, and directly over the patella. In this instance the incision was tortuous to avoid external bruises. The skin was dissected back and protected by tetra towels, fixed on by means of skin clips. Lane's technique was used throughout. The fragments were readily identified and dissected free from the quadriceps tendon and the blood was gently mopped out of the joint. No. 3 silk, interrupted, was used for the repair of the rent as well as the lateral expansion, which was torn almost to its attachment to the outer tuberosity of the tibia. This latter tear was in direct line with the fracture of the patella. About fifteen sutures were used. The skin was then approximated with No. 1 plain catgut. After the dressing was applied and before the tourniquet was removed many abdominal pads were put on the dressing and also at the back of the knee joint, and a firm, flannel bandage was applied. The pads are a necessary precaution because to a large extent pressure is relied on to stop the bleeding. If scant pads are used and a tight bandage applied there is great danger of pressure sores over the now prominent condyles of the femur. The tourniquet was then removed. The procedure occupied twenty minutes. On the third day after operation the patient was allowed out of bed, and walked up and down the hall. This he did daily. I advised

him, however, to keep from flexing his knee. On the tenth day the dressings were removed, a lighter bandage was applied, and the patient allowed to go home. Two weeks and one day after operation he returned to his work, which is that of an office superintendent, and did not require very much walking about. At the end of three weeks he was able to go up and down stairs, with no great comfort, however. At the end of one month, he had very little disability.

The value of this treatment is obvious because of the following fact. Dr. Charles Hair, who is medical supervisor of mines, working in conjunction with the Ontario Mining Association, tells me that many miners who have had fractured patellæ repaired by wiring or other similar device are never able to return to the mine as labourers. Of those who do return some are disabled so long that the cost in hospitalization, wages, etc., reach the astounding amount of several thousands of dollars.

THE EARLY DIAGNOSIS OF ANENCEPHALY

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THE following report is presented to illustrate the case of diagnosis of anencephaly during the later months of pregnancy, and to record a case in which the past family history is of interest.

A review of the available literature on the roentgenographic diagnosis of anencephaly shows a total of 25 cases reported in which a diagnosis was made before the onset of labour. Case[1] reported the first instance of anencephaly diagnosed by this method in 1917. Case and Cooper[2] reported 4 cases in 1926, Weiskotten[3] 3 in 1933, Weinberg[4] 5 in 1934, Stecher[5] 2 in 1935 and Rudolph[6] 2, one in 1925 and the other in 1935. Spangler, Campbell and Willits, Doub, Anderson, Maier, Mooney, Jennings and Nessa have each reported single cases.

The clinical signs of the occurrence of anencephaly during the later months of pregnancy are pathognomonic. Polyhydramnios is in most cases noticed and complained of by the patient. It may give rise to various pressure symptoms. In some it may be absent. Absence of a palpable fetal head confirms the diagnosis of anencephaly, which should be suspected in all cases of polyhydramnios. This occurs in most fetal abnormalities, but anencephaly is itself the most prevalent type of monstrosity. It occurs once in every 1,460 labours according to Ballantyne,[7] and once in every 900, according to a recent report by Stecher.[5]

Having diagnosed the condition by its clinical signs, a careful radiographic examination will confirm the diagnosis by showing an absence of the calvarium shadow. There may be doubt in some films, due to poor technique and the density of the amniotic fluid. The increased use of routine roentgenography in obstetrics would lead to more frequent antenatal diagnoses of this condition.

Once anencephaly has occurred it is very likely to appear again in future pregnancies. Lloyd,[8] in a review of the literature in 1936, does not agree and claims he was unable to find a report of recurrence. Ballantyne stresses the importance of family prevalence and quotes several instances. In the family histories of anencephalics one frequently finds siblings with spina bifida, cleft palate, various types of mental deficiency, as well as recurring anencephaly. He also tells of the remarkable case reported by Martin in which one woman had a history of six anencephalic births. One may safely say that the occurrence of any fetal abnormality in the family of a multipara should make the consultant suspicious of the future production of an anencephalic.

The presence of twin pregnancy does not rule out the possibility of anencephaly. One twin may be anencephalic and the other normal in every respect. Also, both twins may be anencephalics, as reported by Otto in 1841 and by Josephson and Waller[9] in this *Journal* in 1933. The condition has been reported in one of triplets.

Case Report

The mother was white, aged 28, and in general good health throughout her pregnancy. She was of average intelligence, as was also the father. There was no history of syphilis, tuberculosis or alcoholism in either. This was her fifth pregnancy. Her first child was born on November 30, 1933. The infant had a bilateral congenital absence of the radii and was the subject of a report in this *Journal* in 1937.[8] The

second pregnancy resulted in a cryptorchid. The third child was born on April 30, 1936, and was normal in every respect. On October 17, 1936, there was a spontaneous abortion of a three months' fetus, which was lost for examination purposes.

The patient was seen for the first time in her fifth pregnancy on July 16, 1937. She was then about five months' pregnant, and complained of the size of her abdomen which resulted in discomfort and dyspnœa on slight exertion. At times she felt severe cramps in the upper abdomen. Examination revealed that the uterus was enlarged to the size of a full-term pregnancy. The fetal head was not palpable. The fetal heart sounds were not heard. Otherwise the patient's condition was normal. With the past history in mind and the marked polyhydramnios the patient was warned that there was no hope of a living healthy infant. She was asked to have an x-ray examination as soon as possible. She did not co-operate very quickly and the x-ray was not taken until October 16th. In the meantime she was seen frequently and the hydramnios continued to increase. Roentgenographic examination at the Hotel-Dieu Hospital on October 16th revealed an absence of the calvarium shadow, cephalic presentation, and polyhydramnios, confirming the clinical diagnosis.

On October 18th the patient was admitted to the hospital in labour. The membranes were ruptured and an enormous amount of amniotic fluid was passed, approximately five gallons. There was a face presentation. Delivery was not difficult. The fetus was a typical anencephalic and appeared to be almost full-term. It was a female and lived for one hour after birth. Its weight was 3 pounds 13 ounces. The hæmangiomatous mass seen attached at the occipital region was cystic. There was a complete spina bifida. The second toe of each foot overlapped the third toe. This peculiarity has been seen in other anencephalics in our collection of thirteen.

SUMMARY

1. A report of anencephaly diagnosed clinically and by roentgenography before labour is presented to illustrate the case of early diagnosis of this monstrosity.

2. The characteristic signs are polyhydramnios, absence of a palpable fetal head, and absence of the calvarium shadow on the roentgenograph.

3. This case is remarkable because there is a sister with bilateral congenital absence of the radii and a brother is a bilateral cryptorchid.

4. A review of the literature shows that 25 cases of this abnormality have been diagnosed by roentgenography during the later months of pregnancy.

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Case Reports

A CASE OF DISSECTING ANEURYSM OF THE THORACIC AORTA, WITH HÆMATOMA, NEPHROLITHIASIS AND PYELONEPHRITIS

BY WILLIAM OLIVER STEVENSON

Hamilton

This case is of interest on account of its rarity, and because it is a good example of how much one can be mistaken in the diagnosis of a kidney enlargement.

Mrs. A.R., aged 46, a farmer's wife.

History of illness.—This patient throughout her life had never been robust. She was able to have two children, the last, twelve years ago. During the last two years she had gradually failed and at this time came under the care of her physician. He had been called on several occasions to administer opiates for attacks of pain resembling renal colic. The urine contained pus and red blood cells. During these attacks she would run considerable temperature, and a diagnosis of pyelitis and nephrolithiasis was made. The patient and her husband persistently refused hospitalization.

In August, 1937, the patient had a bad fall, striking her left side against a ladder. Since that time she failed progressively. The physician was called on October 17th for pain in the loin radiating into the pelvis, resembling the old renal colic attacks. He did not notice any change in her colour, and stated that she had looked anæmic as long as he had known her (two years). The pain persisted, so that a nightly hypodermic was given. Hospitalization was still refused.

Physical examination.—Examination of the patient on October 27th revealed a very thin woman, weighing about one hundred pounds, in obvious distress; temperature 101°; pulse 120. There was a large, soft, solid mass filling the whole of the left groin, extending from the costal margin below the crest of the ilium, with a lower rounded border overhanging the pelvis. It extended to the midline of the abdomen. The patient was desperately ill, and on this ground consent was finally obtained to remove her to hospital. On admission, her temperature had dropped to 97°; pulse 140; red blood cells 1,300,000; hgb. 28 per cent; white blood cells 36,200, polymorphonuclears predominating. Despite stimulation and intravenous therapy the patient died several hours after admission.

Diagnosis.—A tentative diagnosis was made of a large pyelonephrosis with nephrolithiasis.

Autopsy findings.—The autopsy findings proved most interesting. Upon opening the abdomen the large tumour mass was found to consist of nothing but laminated blood clot. This huge mass, which stretched from the diaphragm down into the pelvis and to the midline of the body was retro-peritoneal. It had pushed the spleen and the stomach over to the midline, and the left kidney was found embedded in its lower pole overhanging the brim of the pelvis. This kidney was the seat of pyelonephritis and pye-

litis and contained four stones. On cross section, the blood clot was over six inches in diameter, and was laid down in laminated form resembling the rings in the cross section of a tree trunk, the oldest rings being quite fibrotic and occupying the anterior position. The freshest clot was found posterior and at the superior pole of the mass immediately surrounding the aortic opening in the diaphragm. A minute examination of all the blood vessels within the abdomen from which such hæmorrhage could arise revealed no abnormality. Upon examining the thoracic aorta it contained many atheromatous plaques and its diameter was irregularly larger than normal. This aorta was surrounded by the same laminated clot of a thickness of 1 to 2 cm. The clot lay between the media and the adventitious coats and extended up to the arch of the aorta. The intima and the media of the aorta were intact. The opening for this hæmorrhage was found on minute examination to be a small slit at the junction of the right aortic intercostal artery supplying the fifth space with the arch of the aorta. This opening was one-quarter inch long and extended through the intima and the media. It was filled with fresh blood clot.

The cause of death in this case, therefore, was hæmorrhage through a dissecting aneurysm of the thoracic aorta. The opening of the aneurysm was so small as only to allow of repeated small hæmorrhages. This condition must have existed for months, as evidenced by the laminated clot. Only small amounts of fresh blood were able to trickle along a path between the coats of the aorta and through the aortic opening into the left retro-peritoneal sub-diaphragmatic space.

TOXÆMIA OF PREGNANCY

By H. S. Good and B. Kanee

Weyburn, Sask.

Mrs. J.H., aged 36 years, of German descent, primipara, and married for ten years. Previous illnesses—small-pox at the age of ten; influenza at eighteen, and occasional attacks of paroxysmal tachycardia of very short duration for the previous three years.

We first saw this patient on December 1, 1936, at which time she was complaining of lower abdominal pain radiating to the back. Her temperature was 100°; pulse 126; blood pressure 128/80. Urinalysis was essentially negative. She complained of pain in her back after a car ride over rough roads. Following strapping of the muscles of her back and abdomen her pains gradually subsided, and she was allowed to return home, apparently normal after three days in the hospital. This patient returned for regular prenatal examinations, at which times her urine was albumin-free and her blood pressure 128/80.

About one week before her expected time she came into the city to await hospitalization. She felt well and her urine was negative and blood pressure normal. Four days later, namely, March 6, 1937, she began to complain of headaches and swelling of the ankles, and upon examination her urine was found to show albumin 3-plus; her blood pressure was 170/90, and there was considerable œdema of her legs. She was admitted to the Weyburn General Hospital and the following regimen instituted: (1) isolation in a semi-dark room; (2) diet, fluids only—salt free, consisting essentially of fruit juices; (3) colonic irrigation twice a day; (4) 25 per cent solution of magnesium sulphate, 10 c.c. intravenously, followed by 1,000 c.c. of 5 per cent glucose daily; (5) phenobarbital, gr. ½, three times daily and as required. After three days' trial her blood pressure remained 190/100 and her urine continued to show albumin 3-plus. Having diagnosed twins, Cæsarean section was decided upon as the best course of treatment.

On March 10th, she was operated on, and upon opening the abdomen we found the peritoneum adherent to the uterus, and the omentum discoloured and somewhat gangrenous in appearance. However, the omentum bled freely on cutting, and the whole abdomen appeared stained with this black pigment arising from the omentum. Twins were delivered, a male weighing 5 lbs. 15 oz. and a female weighing 5 lbs. ½ oz. Following the operation the patient was given 25 per cent magnesium sulphate followed by 1,000 c.c. of 5 per cent glucose intravenously and morphine ¼ gr. The next morning the patient was in a precarious condition, her pulse gradually mounted to 170 per minute; temperature 104.2°; respirations 20. She became cyanosed and her skin was cold and clammy. Oxygen was administered, but with little effect, and then a venesection was performed, about 300 c.c. being removed with apparent relief. Following this a Wagensteen's continuous suction was established for gastric dilatation. Hot linseed poultices were applied to the back and abdomen, and 50 per cent glucose was given twice a day in an effort to increase the kidney function, all of which resulted in a slow but gradual improvement of her condition. On the third day after operation she developed a bronchopneumonia which responded well to short-wave diathermy along with the regular medical care.

Her convalescence extended over a period of four weeks, and her blood pressure gradually returned to normal; her urine became albumin-free, but with a specific gravity of 1.015, and there was a complete disappearance of her œdema. The only other point of interest in her convalescence was an attack of paroxysmal tachycardia which lasted 16 hours, with no response to the many recognized suggestions for its arrest, finally necessitating rapid digitalization.

INVERSION OF THE UTERUS

By W. J. P. MacMillan, M.D., C.M., F.A.C.S., LL.D.

Charlottetown, P.E.I.

Mrs. W.G. was admitted to the City Hospital, Charlottetown, on February 22, 1936, under the monthly service of Dr. L. B. McKenna, now practising in London, Ont. I was asked to see the patient in consultation, and she was found to be suffering from a complete inversion of the uterus. Her family and personal history were uneventful. I had previously operated on this patient in July, 1926, removing a chronic appendix and resecting the left ovary. Her convalescence was rapid and satisfactory.

When she came to the hospital in 1936 she was 29 years of age, a small, thin woman, weighing 112 lbs. After her marriage she had two full-term children and no abortions or miscarriages. When she entered the hospital her youngest child was two years of age. She stated that she had not been well since the birth of that child, at which time, to use her own words, the "womb came down" and was put back by the doctor in attendance. One month after delivery she suffered a severe uterine hæmorrhage, which continued for three months. After that she had menstruated every month, the flow being excessive and lasting ten to twelve days. She said that worry or excitement caused a large flow at any time. Her last menstrual period was two weeks before entering hospital.

On examination, I found a complete inversion of the uterus, the uterine surface being rough, covered all over with definite corrugations, and oozing. It was difficult to determine how long the uterus had been completely inverted. I suspect that the accident

was caused by traction on the cord in attempting to remove a somewhat adherent placenta. Whether the uterus was properly replaced at that time is problematical. Thus it was not possible to say exactly how long the complete inversion had existed, but probably from the time of delivery or very soon after.

At the request of Dr. L. B. McKenna, and with him as assistant, I operated on her on February 26, 1936. In operating I endeavoured to follow the Spinelli method, as detailed in Crossen's "Operative Gynæcology". It was a new operation to me, one I had never seen performed, and I may say I undertook it with feelings of apprehension. I was very careful with my first incision, through the vaginal wall and above the os. I was lucky in not injuring the bladder as I entered the lower peritoneal cavity. The gloved finger with gauze was able to push the bladder out of harm's way; then it was not difficult to get a large grooved director into the os and it followed down to the inverted fundus without difficulty. The collar of tissue around the os was cut with scissors and then the incision was extended from the os to the fundus. The ticklish job of turning the inverted uterus outside in took some time, as the tissues were resistant and a little difficult to mould. It was found necessary, just as Dr. Crossen says, to cut away more than a quarter of uterine tissues before the uterine edges could be adequately approximated to ensure successful suturing. This was done by three layers of sutures, the first interrupted, catching the deep muscular tissue but not taking in the endometrium, the second muscle suture continuous, and the third continuous for the peritoneal coat. Rubber-tube drainage was done anteriorly and rubber-tissue drainage posteriorly. The vaginal wall was closed and a pack inserted for a few days. The patient's convalescence was wonderfully satisfactory. There was no rise of temperature and no sign of sepsis. She made an uninterrupted recovery, being discharged from the hospital in twenty days.

The sequel is interesting. Menstruation recurred in a few months and pregnancy resulted. She re-entered the hospital under the service of Dr. W. H. Soper, and on January 3, 1938, was delivered of a full-term baby, weighing 6¼ lbs. She had a normal pregnancy and delivery. Labour began at 6 a.m. The membranes ruptured spontaneously and the labour terminated successfully without any assistance at 12.10. The placenta was delivered easily one hour later. There was some hæmorrhage, but nothing alarming. Both mother and child did well, and she was discharged from the hospital nine days later.

To me this is a striking example of how much damage and irritation the uterus can withstand, and of how much tissue can be removed without apparently interfering with the ability of the organ to regenerate and function normally.

Therapeutics and Pharmacology

EPIDERMIOPHYTOSIS: ITS TREATMENT

By J. F. Burgess, M.D.

Montreal

Certain local features in the treatment of ringworm of the feet which do not obtain elsewhere in similar infections of the smooth skin should be borne in mind. The marked thickness of the horny layer of the soles of the feet renders difficult the intimate contact of a therapeutic substance with the ringworm fungus. Then, again, the great tendency towards excessive perspiration in the feet of many people stimulates an optimum growth of the fungus. Further, it has been shown frequently that many types of fungi may give rise to this clinical syndrome, and we know that the virulence of these vegetable growths is a variable one.

In general, and this applies to all types of ringworm infection about to be described, therapeutic measures counteracting excessive moisture should be initiated. Undoubtedly, woollen socks increase the humidity of the feet, and, therefore, in most cases the wearing of cheap white cotton socks under woollen socks, if necessary, should be advocated. There is the added convenience that such cotton socks may be sterilized by boiling frequently. As a further aid the use of dusting powders containing a mild antiseptic is advisable. The frequent dusting of the feet with a borated dusting powder, such as, boric acid 1 part, Venetian talc 1 part, kaolin 1 part, is suitable for this purpose. A restriction of fluid intake, and particularly of alcoholic beverages, is sometimes a useful measure.

Certain clinical types which, it is true, oftentimes merge may be distinguished. 1. A recurrent, vesicular eruption along the soles or sides of the feet, with or without some superficial scaling between the toes, tending to flare up in hot weather, is common. Local treatment is probably best carried out by removing the roofs of the vesicles, and the underlying areas swabbed with iodine 1 to 2 per cent in alcohol. At the same time, the soles and interdigital spaces should be covered nightly with Whitfield's ointment, single or double strength, the formula being:

	Standard	*Double strength*
Salicylic acid	1.8	3.6
Benzoic acid	3	6
Zinc oxid. ointment	20	20
White petroleum jelly to make	60	60

2. A type characterized by a persistent, often long-standing, whitish thickening of the skin, most commonly between the outer two toes, with some maceration of the area, is also common. Intensive fungicidal agents may be used in addition to measures stated above, which cause exfoliation in addition to their fungicidal ac-

tivity. Salicylic acid, 12½ per cent, in alcohol, or chrysarobin, 1 to 5 per cent in alcohol, may be rubbed in with some friction daily by means of a cotton swab, care being especially taken to prevent contact with the skin of the dorsa of the toes, which may be unduly irritated. In some cases, where long-standing and associated with much thickening, one may use Dreuw's ointment, the formula for which is:

Salicylic acid	6
Chrysarobin	12
Oil of birch tar	12
Liniment of soft soap	15
Petroleum jelly to make	60

There is the disadvantage that it may cause undue reactions which must be guarded against by frequent observation, or by suitable warning to the patient, and in the fact that it is a very messy application which stains or ruins fabric with which it may come into contact. When marked improvement has been noted less irritant applications may be instituted, such as Whitfield's ointment, or salicylic acid in alcohol, as mentioned above.

3. A hyperkeratotic type, characterized by marked thickening, often in patches on the soles of the feet, sometimes accompanied by marginal pustulation and inflammation, is less commonly seen. In this type strong keratolytic applications may be used, such as Dreuw's ointment, double strength Whitfield's ointment, and reinforced, where it can be given with safety, by the use of x-ray. The initial dose may be ½ skin unit, followed by ¼ skin unit exposures each week, up to a total of 8 exposures. If satisfactory improvement has not occurred then no further x-ray treatment should be given.

4. An acute, inflammatory exacerbation under certain conditions may supervene in the course of any of the above-mentioned types. In this event the toes become markedly swollen, with a great deal of maceration and exudation in the interdigital spaces, and with, not infrequently, large blebs which may or may not become purulent. In such cases rest in bed is essential, the blebs should be opened and laid bare, loose skin being removed, and compresses applied. Boric acid solution may be applied, and this should be applied in such a way as to allow for satisfactory evaporation. The interdigital spaces should be kept apart with absorbent cotton, and it is preferable to apply the compresses every alternate hour, in order that undue maceration of the skin, as a result of too much moisture, should not occur. The use of hydrarg. perchlor. 1-10,000, where there is marked pustulation, may be substituted in the initial period. When there is an offensive odour potassium permanganate 1-4,000, may also be used with advantage. It is wise to continue compresses until the denuded areas are quite free of exudation. Following that, the application may consist of a mild boric acid ointment.

Treatment of the feet should be continued long after any clinical evidence of ringworm infection is present.

The fungus infection may spread to the palms and sides of the fingers in the form of a vesicular dysidrosis, sometimes with pus formation. Treatment here should also consist of boric acid compresses, or the application of a boric acid ointment may suffice. Where such an eruption persists x-ray therapy, in small doses, is a very useful adjunct to topical applications.

SOME PHYSICAL AND CLINICAL CHARACTERISTICS OF SHORT WAVES

BY R. B. TAYLOR, M.D., C.M.

Montreal

Owing to the increasing interest being shown by Canadian physicians in the use of short-wave therapy, it may be timely to point out some essential physical characteristics of this much discussed and comparatively new instrument for the treatment of disease.

We believe at the present time that the curative value of short-wave currents is due principally to heat. There have been many claims as to the value of specific wave lengths in the destruction of infective organisms, but these claims have not been substantiated. We can therefore concern ourselves only with those types of machines which have sufficient energy output to heat any given tissue. There are two types of machine available—those producing damped oscillations by means of a spark-gap system, and those producing undamped oscillations by means of electronic tubes such as are used in radio transmission. Both types of machines have their adherents. For all practical purposes it may be said that either type of machine will produce results provided its output of energy is sufficient.

The general practitioner is confronted with several problems when he contemplates the purchase of a short-wave machine. One of these is the question of portability. He cannot afford to purchase a machine which is so cumbersome that it cannot be transported to the home of a bed-ridden patient, should the occasion arise. Another problem is the selection of a suitable wave length. He is told that he will get the best results with a six meter machine by one agent, while another will assure him that a machine developing sixteen meters is the best for all round work. It is perfectly obvious to the puzzled practitioner that he cannot afford to have several machines of different wave lengths. To overcome this problem, multi-wave machines have been developed which deliver several wave lengths merely by making minor changes of dials and plugs, and these machines are eminently satisfactory for the use of the general practitioner. Practically every type of

condenser electrode as well as electromagnetic induction cable may be used with these machines, making them extremely flexible for everyday use.

It is necessary to call the attention of every user of short-wave equipment to the fact that at the present time there is no method of measuring the intensity of high frequency energy. We must rely largely on the patient's subjective sensation of heat. By increasing or decreasing the amount of heat we are able to obtain a comparative measure of the amount of energy which is necessary in each given case. In many cases the amount of heat should be merely a slight sensation of warmth, and the time of application should be short. In other cases longer exposure and greater amounts of heat are required to obtain satisfactory results. At present the machines in use vary greatly in energy output. Standardization of equipment is necessary if we are to reach a time when, as Schliephake states, "We may reach the point of being able to select and apply optimal wave length for every disease".

Every physician or technician who uses short-wave equipment should make it a rule to test each patient's skin sensitivity before giving a treatment. This is easily performed by means of two test-tubes, one containing hot and the other cold water. A patient whose sensitivity to heat is lowered or absent may be easily burned. The patient should be warned to notify the operator of any abnormal sensation of heat, prickling sensation, or feeling of heat elsewhere in the body. It is well to spend a little time in studying the correct placing of condenser electrodes. Thus, for example, if deep treatment is desired the electrodes should be spaced farther from the body by means of felt pads or Turkish towelling, while for surface effects the electrodes should be closer to the skin surface to be treated. It is well to use Turkish towelling or perforated felt padding in order to prevent accumulation of perspiration, as hot spots develop wherever moisture occurs. Burns result from carelessness, and although, fortunately, they are usually superficial and heal readily, nevertheless there is nothing which will turn the patient or the physician who referred him away from the physiotherapist as quickly as a burn. It is necessary to employ the greatest care when treating the face, as current concentration may occur at any prominent point, such as the tip of the nose, ear, etc. Be sure that the cables do not touch the patient, as burns can occur because of heat concentration where they touch the body. See that the cables do not touch one another, or that they do not rest directly on a bed or couch with metal springs, as fires have occurred through such neglect. The most important factors in avoiding burns are properly placed and spaced electrodes, and a dry skin. Patients should never be treated through clothing, and all metal objects should be removed before treatment is commenced, as metal in an electric field becomes hot, and burns can occur by neglecting to observe this rule. During the summer weather, or when the patient is hot and perspiring, the towelling is liable to become moist, and as a result uneven heating may take place. Always regard a patient's complaint that "it is too hot", not matter what the meter reading may be. Some patients complain of headaches and dizziness when treating the head. In such cases stop the treatment and allow the patient to lie down, and if necessary place cold compresses on the forehead. When the symptoms have disappeared, begin the treatment cautiously, using less current. Never allow the patient to regulate the current or to touch the machine or any metallic objects nearby, as burns may result.

There are various methods of applying short-wave diathermy. It may be employed by using, (1) condenser pad electrodes; (2) cuff electrodes; (3) air-spaced electrodes. These last are made of metal which is enclosed in rubber, bakelite or glass. In addition, electromagnetic induction may be employed by means of (1) a flexible rubber cable, and (2) a disk of bakelite in which a cable is coiled ready for use. All of these methods have their uses, and the operator can by using judgment employ that best suited to the particular condition which he wishes to treat.

There is no doubt but that short-wave diathermy has a definite place among modern methods of treatment. It is not necessarily a cure-all, but it is a valuable adjuvant, because it helps materially to increase the patient's resistance against the invading organism. It is unquestionably valuable in the treatment of bursitis, traumatic tenosynovitis, myositis, neuritis, sprains, and in certain types of arthritis. In traumatic and gonococcal arthritis excellent results have been obtained, and many cases of osteo-arthritis are greatly helped by short-wave diathermy. Rheumatoid arthritis does not respond as well, owing no doubt to the focal and systemic factors, but local joint heating is useful in the treatment of this disease. After treatment with short wave patients may complain of increased pain in the joint, whereas with the old conventional diathermy this did not occur. It is probable that in many of these cases too much heat and too long a treatment period are the factors responsible for the increased pain.

I have been particularly interested in the results obtained in diseases of the upper respiratory tract. In acute rhinitis symptomatic relief is usually obtained in from one to three treatments. The headaches subside, the nasal passages become free, and the discharge rapidly diminishes after the initial treatment. Even if the common cold does not run a long course, the relief obtained by the use of short wave makes such treatment very welcome to the sufferer. When sinusitis exists, rapid and marked

relief follow the use of short-wave diathermy. I have seen several patients who had been suffering from either frontal or maxillary sinusitis for years, and who had submitted to every other form of treatment, relieved by a comparatively few short-wave treatments. It should be a valuable aid to the specialist in rhinology. In bronchial asthma the antispasmodic and anti-inflammatory effect of short waves is the basis for their application, and associated with the customary specific treatment, should be extremely useful. Schliephake, Liebesny, and others have reported very excellent results in the treatment of empyema, and it would be interesting if some of our Canadian investigators would report on a series of such cases. Naturally the treatment of these cases should be in the hands of experienced operators only, and the results should be checked by x-ray.

There has been much controversy about the value of short waves in the treatment of localized infections. Such conditions as infections of the hand or fingers, abscesses, infected cervical glands, furuncles of the nose or face, and chronic otitis media have responded remarkably. In Europe there is a tendency to use short wave exclusively in such cases, but it would appear wise to use surgical measures in conjunction. Often acute localized infections may be aborted by using short waves, but where the inflammatory process goes on to suppuration, pus develops more rapidly than without treatment, and in such cases drainage should be established. Following this procedure healing takes place more rapidly if short waves are used.

In the treatment of pelvic inflammations in the female short waves have been very useful. In some types a vaginal electrode may be used to advantage, while in others, through and through heating appears to produce the best results. I have found that a combination of these methods has given the best results in my own cases. In using the vaginal electrode it is absolutely essential to see that the insulating material is intact or burns are liable to occur, due to direct conductivity of the current.

In the treatment of diseases of the male genito-urinary tract attempts have been made to cure gonorrhœa with short wave. There is no real evidence that it is of use except in the chronic stages. Inflammations of the prostate, and even prostatic hypertrophy, seem to respond favourably to short waves. A prostatic electrode is used, with the other electrode over the bladder. The treatments should be given daily at first, for periods of from 15 to 20 minutes.

When short-wave treatment was first introduced many physicians were violently antagonistic to its use. As one Canadian physician has stated, "Our profession, and righteously so, is strongly conservative as regards accepting new, and as far as they are concerned, untried therapies; especially this, as certain phases of it have been meat and drink for the charlatan". However righteousness must eventually prevail, and now it is almost impossible to select any journal dealing with medicine, surgery or the specialties, but that somewhere will be found articles dealing with physical medicine and references to short-wave diathermy. Much remains to be done in this field, and it can only be done by competent physicians who know both their medicine and their physics. There is no doubt but that short-wave currents have added a valuable instrument to our armamentarium. It behoves those of us who are using this type of equipment to continue our research, both experimental and clinical, and by cooperating with the profession in general, to remove whatever skepticism may now exist, by earnest effort in this field, and also by bringing to the attention of the medical profession, as a whole, through the medium of our *Journal,* the results of our investigations.

Clinical and Laboratory Notes

THE USE OF PEPTONE BROTH IN RUPTURED APPENDIX CASES

By C. GRANT BAIN, M.D., M.S.

Centralia, Washington

During the past four years 38 consecutive ruptured appendix cases with all grades of peritonitis have been treated by using peptone broth at and after operation. There were two deaths. None of these cases was treated by the expectant method. Some of my early cases have been reported.[1, 2] The results in this small series speak for the employment of peptone broth or some similar substance.

The ages varied between 3 and 84. There were 6 patients over 57, with one death. This was an 84 year old man who refused operation until general peritonitis had been present for over twenty-four hours. The other was a boy of 8 who had been very ill with abdominal symptoms for three days following influenza. Post-mortem examination in both cases showed the peritoneum to be surprisingly clear.

The duration of the symptoms before operation varied between one and ten days, with an average of just under four.

Peptone broth was used to wash out the abdomen after suction had been employed, and 50 to 100 c.c. were left in or injected through the drainage tube after closing. This soft rubber tube was placed in the right iliac fossa, irrigated daily with broth as it was shortened, and completely removed by the fifth or sixth

day. Broth was also used to irrigate any infected wounds.

A right rectus incision was used in all cases, displacing the muscle mesially so as to obtain adequate exposure. Full right lateral position was maintained for two or three days, to provide drainage, instead of the Fowler position.

No fluids were allowed by the mouth for forty-eight to seventy-two hours, and intravenous 5 per cent dextrose in normal saline was given, 1,000 to 1,500 c.c. twice daily. Morphine was given freely for forty-eight hours in order to control peristalsis. No laxatives were used, but mineral oil was given one-half ounce twice daily, beginning on the third day. On the fifth day a small glycerin and water enema was given if the bowels had not moved satisfactorily. Soft diet was then allowed, replacing the liquid feeding which had been maintained up to that time. Where colon infection was present or developed subsequently a mixed colon vaccine or serobacterin was usually employed.

The temperature and pulse were usually down to normal by the fifth day. No reaction from the broth was observed, and convalescence was more or less uneventful.

There was one case of post-operative pneumonia apart from the two fatalities. No case of secondary abdominal abscess, no fæcal fistula, no incisional hernia, and no definite post-operative or subsequent obstruction occurred in any of the cases. Ileus was present in two cases for a few days. Vomiting was almost negligible after operation.

The majority of the patients were dismissed from the hospital in two weeks, the remainder within three weeks. A questionnaire just returned from these patients showed no complaints attributable to the operation. Their general health was good.

Peptone broth has been used with benefit in many other infections[3] and also as a prophylactic against infection. It has a hæmostatic effect. Its action in these cases appears to be to set up a prompt defense reaction which prevents peritonitis.

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Editorial

THE ASSOCIATION OF GALL-BLADDER DISEASE WITH CARDIAC LESIONS

PAIN is the red light that indicates danger. Whenever it is complained of it is the duty of the medical man to determine the cause. This task is often difficult, sometimes impossible, and always demands careful study and much clinical experience. Particularly when pain occurs in the central area of the body, anteriorly, that is, in the substernal and epigastric regions do the difficulties impress one, and here correct diagnosis is specially important, for great issues are involved. We should make clear that the pain referred to in the following remarks is *chronic* pain, not the pain of acute inflammatory disease. To discuss every kind of pain that may arise in the region specified above would take us too far afield.

The first thing to determine is whether the pain complained of originates below or above the diaphragm. In many cases this is easy; in some it is difficult. Sub-diaphragmatic pain is most often due to gastritis, peptic ulcer, cholecystic disease, or diaphragmatic hernia. Gastritis is related to errors in diet; there may be sour eructations; and the pain is due to flatulency, spasm, or actual inflammation. The pain associated with peptic ulcer is periodic, related to the ingestion of food, and the condition may be associated with hæmatemesis or melæna. X-ray examination will often be conclusive. In the case of hernia of the stomach into the thoracic cavity the pain is erratic, intermittent, of a burning character, and often relieved by posturing. Here, too, x-ray examination may clinch the diagnosis. In the case of cholecystitis or cholelithiasis the condition may be suspected from a history of previous acute attacks, with fever, possibly, and jaundice. The pain may be associated with the taking of food. Sometimes, on deep inspiration, the gall-bladder region is distinctly tender. Cholecystography will greatly assist here also.

Pain originating above the diaphragm, so far as the anterior midline of the body is concerned, is usually due to a myocardial lesion, sometimes coronary thrombosis; more

rarely, paroxysmal tachycardia (7 to 8 per cent); aortitis or aneurysm.

In practice the task of the clinician, most often, is to distinguish between the pain of gall-bladder disease and that due to the heart. This brings up the question of the association of lesions referable to the two viscera.

A study of the literature seems to warrant the acceptance of the following conclusions.[1] (1) Myocardial degeneration is not infrequently found in cases of cholecystitis and/or cholethiasis. (2) There is some evidence to suggest an increased incidence of lesions of the coronary arteries in those suffering from gall-bladder disease; (3) and very important, the clinical manifestations of gall-bladder disease may closely simulate disease of the heart, particularly coronary artery involvement, and vice versa. If these conclusions are correct it is obvious that in every case of precordial or epigastric pain of a certain type the question arises as to which organ, heart or gall bladder, is at fault, and, further, it should not be overlooked that both may be.

The question of pain in the chest has been well discussed by J. A. Oille.[2] His analysis of 600 cases is illuminating. Of these 225 had pain that was considered to be of cardiac origin, that is, 37.4 per cent. "So that, if the average patient thinks he has a cardiac pain the chances are nearly two to one that this is not so." Of the non-cardiac group, comprising 392 cases, the pain in 201, roughly 50 per cent, was due to root involvement by spondylitis. In another 35 the diagnosis of spondylitis was probable, and in 52 or 8 per cent of the total 600, no cause whatever was found for the pain. Unfortunately, the number of patients with angina or coronary occlusion who had gall-bladder disease as well was not investigated, but Dr. Oille may be quoted as stating that quite a large number of his patients had pains due to both. Space does not permit us to go fully into all the points involved in the diagnosis of cardiac pain, but, after all, these are widely known. The reader is referred to Dr. Oille's informative article for details.

In the case of cholecystitis and cholelithiasis the most common symptoms are digestive—a sense of fullness, flatulency, nausea, sometimes vomiting. Jaundice may be present. The pain may radiate to the right shoulder or to the angle of the right scapula, or, occasionally, into the left breast. The pain, however, when felt in the left breast, lasts too long to be due to angina, is not related to exertion, and may be related to meals. In every case of chest pain, where either or both organs, heart or gall bladder, are possibly involved examination should be thorough, with recourse to x-ray, the electrocardiogram, and the cholecystogram.

S. M. Laird, in his valuable article referred to above,[1] confirms the impression previously gathered that there is a close, and probably an etiological relationship between cholecystitis and myocardial disease. His series consisted of 65 cases of disease of the gall-bladder and biliary tract; of these 58 were female and 7 male. Fifty of the patients had a clinical cardiac lesion and 15 had no evidence of such. All of the 7 males and 74 per cent of the females manifested cardiac disease. Forty of his patients were operated on, and in 29 gall-stones were found. Nineteen of them presented cardiac manifestations; 10 did not. Thrombosis of a coronary artery occurred in 12 per cent of cases of gall-bladder disease. Laird remarks that this event may cause difficulty in differential diagnosis. Disease of the gall-bladder was commoner in females than in males, in the proportion of 8 to 1.

On the question of the relative proportion of heart disease in patients with gall-bladder disease and in those without Laird quotes Schwartz and Herman.[3] By decades, Schwartz and Herman give the following figures in non-gall-bladder cases and cholecystitis cases respectively; third decade, 20 per cent, and 46.6 per cent; fourth decade, 8 and 41.6; fifth decade, 41.9 and 58.6; sixth decade, 54.1 and 79.1. The conclusion is obvious.

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Obesity, a condition so often present in connection with gall-bladder disease, while possibly a factor, cannot be the whole explanation of the occurrence of cardiac lesions in cases in which the biliary passages are involved. In differential diagnosis age and sex should be considered as well as the points enumerated above.

Laird records his impression that infection of the gall-bladder is a definite etiological factor in the production of the myocardial lesions commonly found in these cases, and feels that there is some evidence to suggest that the longer disease of the gall-bladder is permitted to exist the greater is the possibility that cardiac manifestations will arise. He therefore advocates early operation in gall-bladder disease. In his series cholecystectomy produced a cure of the gall-bladder symptoms in 78 per cent of cases in which this operation was performed, and, moreover, appeared to be a satisfactory measure for obtaining improvement of the cardiac manifestations associated with them. Naturally, where operation is contemplated the cases should be carefully selected.

A.G.N.

MEDICAL RESEARCH

THIS is an age of research. In the many colleges and institutes of learning throughout the world there are those who are turning out papers based on experiment literally by the thousands. In some institutions it would seem that the academic success of the junior teachers, particularly, is measured by their output, irrespective of its quality. Grist is demanded from the mill; output must be maintained; the product need not be of high quality. The tendency is, as some one has put it, to concern oneself "with more and more about less and less", until we are reminded of the investigator who undertook to determine the weight of a single spermatozoon. The result is that the indexes are cumbered with titles and the shelves of libraries groan under the weight of monographs which nobody reads. In the case of the live subjects the number of papers that are published every year is such that no one person can master them; many of them are useless, because they must be passed by. One is tempted to suggest that a jury be appointed whose duty would be to pass on the quality of all research papers turned out and consign to the flames, as they used to do with books in the old days, all that did not measure up to a certain standard. Mistakes, doubtless, would be made, but, on the whole, the result would be salutary. This, of course, brings us to the question of what constitutes a proper yard-stick.

It is not everyone who is qualified to be a first-class research worker. Mere zeal is not enough. There should also be the capacity to select a subject worth investigating (vision), to observe accurately, to reason logically, to record clearly, and, withal, to possess imagination. Imagination is not generally regarded as an asset in the man of science, yet it is so, for it is the quality which discovers new worlds to conquer. To measure up to this standard, moreover, means that the investigator must have a good knowledge of the basal medical sciences, chemistry, physics, biology and physiology. Nevertheless there have been good investigators who were lacking in one or more of the desiderata mentioned here. Take Claude Bernard, for example. Judged by modern standards, his methods were crude, his observations were often incomplete, his "facts" were not always facts. Yet in spite of it all he was able to deduce principles which have subsequently been found to be fundamental, and his work, imperfect as it sometimes was, has placed him among the immortals. He had imagination. We may not hold him up as the ideal exemplar of the research worker, yet there are few Claude Bernards in the world. In cases where the highest qualifications cannot all be found in one man it may be sufficient to group workers together whose talents are mutually complementary. What would seem to be necessary for us in Canada is some central body which could take stock of the research situation, assign subjects for investigation, coordinate effort, and subsidize the more promising workers. For the

present it would seem that the problems considered should have a direct practical bearing.

We are pleased to be able to state that the first step, and that a big one, has been taken to meet the situation. On the initiative of Major-General McNaughton, President of the National Research Council, Ottawa, and with the active cooperation of Dr. T. H. Leggett, President of the Canadian Medical Association, pour-parlers between the two bodies named took place last year, with the result that the Canadian Medical Association enthusiastically endorsed a proposal to constitute an Associate Committee of Medical Research under the ægis of the National Research Council. A conference of representatives of the National Research Council, the Department of Pensions and National Health, the Canadian Medical Association, and the Royal College of Physicians and Surgeons of Canada was held in Ottawa on October 28th last. This conference approved of the appointment of a Preparatory Committee composed of the President of the National Research Council (General McNaughton), Sir Frederick Banting, the Deputy Minister of Pensions and National Health (Dr. R. E. Woodhouse), the President of the Canadian Medical Association (Dr. T. H. Leggett), and Dr. G. S. MacCarthy. This Preparatory Committee held four meetings and it decided to recommend the calling of a general conference, composed of representatives of interested bodies, namely, Faculties of Medicine of Canadian Universities, Medical Research Institutions apart from Medical Schools, Dominion and Provincial Departments of Health, the Canadian Medical Association, and the Royal College of Physicians and Surgeons of Canada. This general conference met on February 18th, of this year, with an attendance of fifty-nine delegates coming from all the provinces. Unanimous approval of the proposal to establish an Associate Committee on Medical Research was voiced, and it was decided to recommend to the National Research Council the appointment of the following members to the new Associate Committee—Sir Frederick Banting, Toronto University (*Chairman*); Drs. G. H. Ettinger, Queen's University; A. Grant Fleming, McGill University; J. E. Gendreau, University of Montreal; Duncan Graham, University of Toronto; V. E. Henderson, University of Toronto; Donald Mainland, Dalhousie University; Pierre Masson, University of Montreal; J. C. Paterson, Regina General Hospital; W. G. Penfield, McGill University; P. H. T. Thorlakson, University of Manitoba; E. A. Vallée, Laval University; together with the following, *ex officio*:—The President of the National Research Council, the Deputy Minister of Pensions and National Health, the President of the Canadian Medical Association, and the President of the Royal College of Physicians and Surgeons of Canada. These recommendations were approved by the National Research Council, and formal acceptances were received from all the nominees.

The duties of the Associate Committee, as defined by the terms of reference, are (1) to receive suggestions for requirements in respect of medical research; (2) to consider by whom the investigations required can be best carried out and to make proposals accordingly; (3) to correlate the information when secured, and to make it available to those concerned; and (4) to do such other things as the Committee may deem advisable to promote medical research in Canada. A survey is to be made in regard to the research work now in progress in the various Canadian institutions with the view of determining how best these activities may be aided and developed. This should go far towards realizing the ideals set forth at the beginning of this leader. It is hoped by all that this Associate Committee will prove the first stage in the creation of a Medical Research Council for Canada. Undoubtedly, a momentous step forward has been taken. A.G.N.

Editorial Comments

To Our Members: On Federation

We are happy to inform our readers that the Ontario Medical Association at its Fifty-eighth Annual Meeting, held recently in Toronto, unanimously voted to become a Division of the Canadian Medical Association according to the plan outlined in the By-Laws.

As the matter now stands we have two provinces which have become Divisions, namely, Alberta and Quebec. We have two provinces which have definitely made application to become Divisions, namely, British Columbia and Ontario. It would indeed be splendid if the remaining five provinces would find it convenient and expedient to come to the Halifax meeting prepared to make application to become Divisions. It will be recalled that, when the Association last met in Halifax, in 1921, an almost moribund body received new life which carried it to its present position. It would seem appropriate that Halifax should once again be the scene of a further advance in the upbuilding of our national Association.

The proposed Constitution and By-Laws for Divisions has been published in the May *Journal* and again appears in this issue. Careful examination of this will show that it strengthens the position of the Provincial Associations within the Canadian Medical Association, and places no demands or strictures upon the Provincial Associations which in any way interfere with their autonomy. Most respectfully do we suggest that if your province is one of the five from whom we are hoping to hear in Halifax you will accept this communication as an invitation to do your part to bring about the realization of an ideal much to be desired.

The Library of the Academy of Medicine, Toronto

The April issue of the *Bulletin of the Academy of Medicine*, Toronto, is a special number with gilded cover (and contents to match) in honour of the golden jubilee of its Library, which began as the Ontario Medical Library in 1888 and has grown from 1,500 volumes the next year, and 4,600 on the organization of the Academy in 1907, to a present enviable total of more than 27,000 volumes. Its history is interestingly recorded by Dr. H. B. Anderson. Dr. Gwyn writes of the contributions of his uncle, Osler, including a good collection of medical portraits (which, consequently, Osler's own library at McGill entirely lacks). For a modern, practical, and working library the Academy's is astonishingly rich in works of the old masters who laid the cultural and scientific foundations of our profession. There is a masterly survey of their 16th century books by Dr. J. H. Elliott, to whose insight and enthusiasm, one suspects, their acquisition may be largely due, and there are shorter articles on a fine mediæval manuscript, by Dr. O'Sullivan; the 17th century books, by Dr. Cameron; the portraits, by Dr. Rolph; the Museum, by Dr. McCulloch; the famous Johnson cabinets which led Osler as a schoolboy into the paths of microscopy and science; old infant-feeding apparatus (Dr. Drake); the needs of the library (Dr. Clarkson); and a handlist of the very excellent collection of the history of pathology made by the late Oskar Klotz.

Illustrations include two facsimiles, one of a gracious letter of Oliver Wendell Holmes, who was among the earliest donors, the other of a hand-written page from the glorious masterpiece of Canadian medicine, "The Internal Secretion of the Pancreas, by F. G. Banting and C. H. Best. (Read before the Academy of Medicine, February 7, 1922)."

The most urgent need of the Library is space. May ways and means soon be found to solve its housing problem.

W. W. FRANCIS

Railway Tickets—Extension of Time for Illness

Some little time ago we had correspondence from the Canadian Passenger Association with regard to the increasing number of requests from railway passengers to have the time limit of their railway tickets extended on account of illness. The following paragraph is quoted from that letter:

> The railways have found during the last few months an extraordinary large number of these certificates being presented. In some instances it is quite obvious that the cases are deserving ones, but we do feel that some undue advantage is being taken of this privilege, possibly through humanitarian feelings on the part of the medical men. This has caused considerable embarrassment to both the patients and the railways, and I would again ask you to circularize your members, or possibly include an article in your journal, asking that every precaution be taken by members of your profession in the signing of such certificates; furthermore, that certificates must be filled in in full and not simply signed in blank. This is a privilege that is placed in the hands of the medical profession, and we feel that it is only necessary to draw your attention to the necessity of seeing that each and every case is absolutely legitimate and in accordance with the regulations governing this concession.

No doubt, all that is necessary is to call the attention of our members to this matter.

Note.—The Canadian Passenger Association, Western Lines, desires to inform the medical profession and their patients that, in the territory Port Arthur to the Pacific Coast, effective

June 1st, no extensions will be made on local bargain coach excursion tickets on account of illness.

A Warning Notice

The general manager of *Surgery, Gynæcology and Obstetrics* writes us in part as follows.

We have received complaints from some of our subscribers in Winnipeg, Manitoba, concerning the activities of one Mr. W. H. Patterson. He has collected money from subscribers without authority and has failed to account to us. I have also learned of his activities in connection with other publications. You may recall that this man Patterson defrauded a considerable number of doctors in Manitoba and Alberta during the latter part of 1936, and I am anxious to do everything possible to put an end to such activities. . . .

I am in communication with the Chief Constable of Winnipeg, hoping that it may be possible to take action in the matter of these complaints.

(Signed) A. D. BALLON,
General Manager.

Special Articles

DIET AND NUTRITION

NUTRITIONAL REQUIREMENTS DURING PREGNANCY*

BY E. M. WATSON

University of Western Ontario Medical School, London, Ont.

IV.

The nutritional requirements of the expectant mother are exactly those of any healthy woman of child-bearing age plus certain dietary reinforcements. During pregnancy the mother must be supplied not only with all the nutritional factors necessary for her own well-being but, in addition, nutritive substances for the developing offspring. The fetus *in utero* is essentially parasitic. It takes what it needs from the mother's blood stream and even draws upon the organic stores of the maternal host. Nature has decreed that the imperious demands of the unborn child be supplied regardless of the cost to the mother in terms of demineralization, loss of tissue reserves, vitamin deficiencies, and the consequences thereof.

There is evidence in favour of a relationship between nutrition and certain of the disabilities and toxæmias associated with pregnancy and childbirth. Further, the fate of the offspring is dependent in large measure upon the nutritional state of the mother before and during pregnancy. The effect of nutrition upon the maternal morbidity and mortality rates and upon neo-natal and infantile mortality is recognized.

Attention to the diet, therefore, constitutes an important item in the antenatal program, and the need for careful instruction to the gravid woman with respect to her food requirements is obvious. In this regard special consideration must be given to the so-called "protective" foods, namely, the minerals, vitamins and "good" protein. The more strictly "energy-giving" foods are of relatively less significance. In the following review, the more important dietary requirements of normal, uncomplicated pregnancy are outlined.

MINERALS

One of the commonest defects of modern dietaries is a faulty mineral supply, and during pregnancy the needs for calcium, phosphorus, iron and iodine are emphasized.

Calcium.—It is essential that the pregnant woman receive sufficient calcium in her food so that she will not have to sacrifice the calcium of her bones and teeth in the interests of the developing fetus. Milk is noted for the abundance and the availability of its calcium salts. A favourable calcium balance may be acquired by the ingestion of one quart of milk a day in addition to other calcium-bearing foods such as cheese, fruits and vegetables. Not only is the amount of calcium in the diet important but provision for its utilization must be assured. This involves a consideration of vitamin D, further reference to which appears below.

Phosphorus.—Phosphorus, being more widely distributed in foods than calcium, is less likely to be deficient in the average diet. If the protein requirements and other dietary principles as outlined herein are observed the need for phosphorus during pregnancy will be met.

Iron.—The fetus absorbs a considerable amount of iron from the maternal organism for use in blood formation and in building up a reserve supply of iron which will serve the infant during the early part of its extra-uterine existence. This drain upon the mother, unless counterbalanced by the ingestion of iron-rich foods or iron in some other form, such as Iron and Ammonium Citrate or Ferrous Sulphate, may result in a more or less severe grade of hypochromic anæmia.

Sources of food iron are liver, kidney, lean meat, eggs, whole grain and lightly milled cereals, vegetables, fruits and molasses.

* This is the fourth in the series of articles on Diet and Nutrition, prepared under the auspices of the Association's Committee on Nutrition. Previous articles can be found in the *Journal*, 1938, **38**: 277, 387 and 491.

Iodine.—The infant depends upon the mother for its iodine compounds during the prenatal and nursing periods. Cretinism may be avoided by insuring an adequate intake of iodine during gestation. The best sources of natural food iodine are sea-water foods and fish-liver oils. Where sea fish are not available, the provision of extra iodine in the form of iodized salt or in some other way is necessary.

VITAMINS

There is a definite relationship between normal reproduction and certain of the vitamins. While the commonest deficiency is probably that of vitamin D, the demand for all the vitamins is increased during pregnancy; so relative deficiencies may supervene. An adequate provision of the vitamins, other than vitamin D, can be realized by including in the dietary sufficient of the protective foods without recourse to special products.

Vitamin A.—The chief function of vitamin A is the preservation of health and vigour, with particular reference to the condition of the mucous membranes; in this way it promotes resistance to infections. The best sources of vitamin A are whole milk, cream, butter, cheese, egg yolk, the green leafy vegetables, the yellow vegetables, liver and fish-liver oils.

Vitamin B_1.—To some extent vitamin B_1 presides over the activities of the gastrointestinal tract. An insufficiency of this factor may result in atonic constipation and impaired absorption from the intestine. Also, a marked prolonged deficiency may contribute to the so-called gestational polyneuritis.

Vitamin B_1 is provided in whole grain and lightly milled cereals, vegetables, fruits and egg yolk. Two concentrated sources of the vitamin which may be used to augment the diet are brewer's yeast and wheat germ.

Vitamin B_2.—It is possible that certain cases of macrocytic hyperchromic anæmia of pregnancy may be related to a deficiency of the vitamin B_2. This factor is contained in many of the foods mentioned above in connection with vitamin B_1, but meat and milk contain more vitamin B_2 than B_1.

Vitamin C.—The requirement for vitamin C is increased during pregnancy, and it is recommended that the diet of the pregnant woman contain a sufficiency of this substance. Rich sources are citrus fruits, tomatoes (raw or canned), apples and potatoes.

Vitamin D.—An adequate supply of vitamin D in the maternal diet is essential for the utilization of the calcium and phosphorus so necessary for the calcification of the fetal bones and teeth. The ordinary foodstuffs are notoriously poor in vitamin D, for which reason cod liver oil, or its equivalent, may be regarded as a food to be included in the daily diet of the pregnant woman. A lack of sunshine increases the need for vitamin D.

Vitamin E.—Experimental and clinical data suggest that vitamin E is necessary for the normal development of the fetus and the completion of pregnancy. While no relationship has been established between the occurrence of abortions and a deficiency of vitamin E, women with histories of repeated spontaneous abortions have prolonged their pregnancies to full term while taking concentrated preparations of the vitamin (wheat germ oil). Except in unusual circumstances, however, a diet which is adequate in other respects contains enough vitamin E to fulfil all ordinary requirements.

PROTEINS

There is some difference of opinion with regard to what constitutes the optimum intake of protein during normal pregnancy. Approximately 100 grams per day would seem to be an appropriate amount. Of greater importance, however, is the assurance that the protein foods be those of the highest biological quality, specifically, the flesh proteins derived from meats, fish and poultry, the protein of milk and milk products and eggs. If the daily food allowance provides one quart of milk, one egg, and a liberal serving of meat (muscle) in addition to the other necessities comprising a balanced diet, the protein requirement should be covered adequately. The glandular tissues (liver, kidney, thymus, pancreas) are highly nutritious as regards the character of their protein, mineral, and vitamin contents. The use of a food of this type once or twice a week in place of ordinary meat is commendable.

CALORIC REQUIREMENTS

The basal energy expenditure is increased during the second half of pregnancy, but this increase tends to be compensated by decreased muscular activity. There is rarely any need for special instruction regarding the caloric value of the diet in pregnancy. The average energy requirement throughout pregnancy is probably 2,400 calories daily, although this may rise near term. Except under extreme conditions diet has little effect upon the birth weight of the child. The real danger rests in a tendency to consume the bulk of the calories in the form of concentrated carbohydrates, with a coincident reduction below the safety level of the essential protective foods.

The physiological aspects of nutrition can not be separated from the social and economic factors. Of all members of the population, the pregnant woman deserves the greatest nutritional "protection".

FOODS BEST SUITED FOR NORMAL PREGNANCY

Daily requirements.—

Cereals: 1 whole grain product, served as cereal, muffins or pudding.

Bread: Whole grain is best; at least three slices a day.

Milk: 1 quart to drink; also, cheese or milk dishes, once daily.

Fruits: 2 daily, 1 cooked (*e.g.*, apple sauce, prunes, apricots, pears), and 1 raw, from the citrus fruit group (oranges, grape-fruit, lemons, pineapple). Raw vegetables, as listed below, 2 or 3 times a week will replace citrus fruits satisfactorily.

Vegetables: One serving of potatoes or a substitute such as rice, macaroni or spaghetti. One or more cooked vegetables, preferably from the green leafy or yellow bulky variety, such as spinach, Swiss chard, beet greens, carrots, squash, etc. One raw vegetable, to substitute for citrus fruits.

Meats and fish: One serving daily. Liver should be served once a week at least. A meat substitute, such as beans, peas or lentils, may be chosen once a week.

Eggs: One a day as such, or used in cooking.

Desserts: Simple puddings once or twice daily, preferably milk and egg or fruit combinations.

Cod liver oil: 400 international units of vitamin D (1 teaspoonful of cod liver oil).

SPECIMEN MENUS

1. *Moderate cost diet for pregnancy—2,800 calories.*

Breakfast: Apple sauce, whole-wheat cereal, whole-wheat bread, butter, honey, milk.

Dinner: Roast beef and gravy, mashed potatoes, peas, whole-wheat bread, butter, custard pie, milk.

Supper or lunch: Tomato juice, macaroni and cheese, beet salad and egg, whole-wheat bread, butter, apricots, oatmeal cookies, milk.

(Part of the quart of milk required may be taken between meals and before retiring at night.)

2. *Low cost diet for pregnancy—2,800 calories.*

Breakfast: Thoroughly cooked oatmeal, whole-wheat bread, butter, jam, milk.

Dinner: Meat or liver loaf, potatoes, turnips, bran muffins, butter (or margarine), chocolate bread pudding, milk.

Supper or Lunch: Cream tomato soup, cottage cheese, baked potatoes, cabbage and carrot salad, whole-wheat bread, peanut butter, banana, gingerbread, cocoa.

(Part of the quart of milk required may be taken between meals and before retiring at night.)

The author is indebted to Miss Marion Penhale, of the Dietetic Department of the Victoria Hospital, London, for suggestions regarding the lists of foods and the menus.

Men and Books

A TUDOR WORTHY

MASTER ANDREW BOORDE OF PHYSYCKE DOCTOUR

BY E. P. SCARLETT

Calgary

> Doctors are generally dull dogs; and nobody in tolerable health and spirits wishes to hear anything about them and their quackeries.
> —(Christopher North).

Medical biography has concerned itself for the most part with the great figures who have contributed in some way to the progress of medicine. In so doing the treatment of its subjects has inclined to be austere and at times pedestrian. Virtues are assessed in terms of clinical acumen or laboratory formulæ. The man must illuminate his work. Reality, if it does emerge, is rigid, and the reader, sensing boredom, passes on to something which is more vividly painted in the colours of imagination. For good biography, like good food, should both satisfy the palate and stimulate the imagination. It is difficult to account in any other way for the surprise and excitement with which many people read the biography of Sir William Osler, as if to say, "Why, here is one doctor who was a great man!" As if there had not been countless medical men who were great gentlemen, adventurers and artists, whose lives need none of the trickery of modern sensational writing to make them sagas of living, only downright imaginative recording. Medical men by the score are there in the shadows of the past waiting to be called to life by prose that makes them something more than figures cut in sober alabaster. Great and small, they must be recreated as living human beings. For in the writing of biography it is better to have the nose, Cromwell-like, wart and all, than no nose at all.

Because of its severe method medical biography has not fared sufficiently afield to incur the displeasure of the modern biographers of the school of Strachey and Maurois, who will no longer permit us decently to burn incense at the shrines of the great. However, these critical guardians of the art have passed no prohibition against writing as lustily as one will of the little fellows who made no claim to greatness. And luckily there are more fish in the sea of medical history than ever came out of it in the nets of our biographers, numerous as these now are. It is one of these smaller fry about whom I wish to write, a shrewd fellow who by his wisdom, his curiosity about things, and his forthright manner of speech has achieved a thin measure of immortality. In his medical relations he was possessed of some skill and, above all, of common sense. He has escaped oblivion because in his desire for a reputation which might be gained by the written word he wrote books that are still readable.

ANDREW BOORDE—A GENERAL ESTIMATE

> I am a true doctor indeed, that tie up my living in the knots of winding sheets.
> —(Thomas Dekker).

Andrew Boorde lived in the sixteenth century and is mentioned in Fuller's "The Worthies of England". He is best remembered as a "worthy". And if one were to justify the writing of a sketch of his life it could not be done more appropriately than in the words of a book of those times.

> "But it may be asked cui bono? To what good end? I answer. 1. To gain some glory to God. 2. To preserve the Memories of the Dead. 3. To present examples to the Living. 4. To entertain the Reader with Delight. 5. To procure some honest profit to myself."
> —(Anglorum Speculum).

That apology leaves little more to be said. If, however, you are not to be satisfied with general statements, one can, I fancy, be more explicit in summary fashion without embarrassing the aspiring ghost of Boorde himself. Be it known then that Andrew Boorde "of Physicke Doctor" was a physician of some eminence in the reign of Henry the Eighth, trusted by Sir Robert Drury and the Duke of Norfolk, and waiting upon the king on at least one occasion; private agent of Thomas Cromwell, one of the king's ministers; a great traveller, his book "The Introduction of Knowledge" being a sixteenth century Baedeker, and the original of all other English travel handbooks of Europe; one of the first writers who sought to popularize knowledge of health and disease in his books, "A Dyetary of Health" and "The Brevyary of Health"; a wit, and at least a doggerel poet, as seen in his "Treatyse upon Berdes"; a robust figure about whom certain legends have grown, crediting him with being the original 'Merry Andrew', and with being the author of such quaint tales as the "Merie Tales of the Mad Men of Gotam"; altogether a pleasant companion through whose eyes we may see the world of the sixteenth century.

To physicians Boorde may be commended because of his shrewd common sense in practice, but more so because in his love of travel he was urged, as he says, by a zeal "to se and to know the trewth of many thynges" and "to have a trewe cognyscyon of the practis of Physycke". And to those who scorn "vermiculate" learning but delight in the art of living, Boorde is worth knowing because of his wisdom, his humour, his deep love of living, his love of the countryside, and, most of all, for his high regard for mirth. The spirit of the great genius of his age, François Rabelais, is constantly at his side, and the jovial vigour of generations of Englishmen who have laughed and talked in taverns comes out in his writings. For if, as has been said, wisdom consists in caring immensely for the few right things and not caring a straw about the rest, Boorde was a wise man.

To know Boorde we must go to his works, where quaint opinions, superstitions, genuine piety and unabashed coarseness jostle each other, making a delightful medley for the reader. Boorde was an independent spirit. Like Corin in "As You Like It", he roundly declares that "I earn that I get, get that I wear, owe no man hate, envy no man's happiness, glad of other men's good, content with my harm". Like all human beings he possessed his share of weakness, early in life being released from his vows as a Carthusian monk, being, as he writes to his superior, "nott able to byd the rugorosyte off your relygyon", and later, like his sex, having "bursts of great heart and slips in sensual mire". He was possessed of a most diligent wit and a zest for life. "There is nothynge," he writes, "that doth comforte the herte so much, besyde God, as honeste myrth and good company". Like men of his age, he found life good, rejoicing in the New World discoveries and in the printing press which all regarded as "an engine of immortality". Indeed, Jerome Cardan, a contemporary medical writer, thinking of these things, remarks: "It is true that, to compensate these things, great tribulations are probably at hand: heresy has grown, the arts of life will be despised, certainties will be relinquished for uncertainty. But that time has not yet come. We can still rejoice in the flowering meadow of spring." And rejoice Boorde did, albeit more soberly as became a monk-physician.

With this love of living, Boorde, thanks to his Creator, possessed a gift of curiosity, a store of information gained from travel and study, and somewhat of the itch to write. This combination made him one of the first popularizers, a vocation that has reached vast proportions in our own time. In travel, medicine, health and astronomy he proceeded in the manner of his physician's craft to hand out information to the public, hoping that they would swallow his medicine with good humour, for, as he says in his introduction to "The Dyetary of Helth", "myrth is one of the chefest thynges of physycke, the which doth aduertise every man to be mery and to beware of pencyfulness". The words that stand on the title-page of "The Dyetary of Helth"—"Hereafter followeth a Compendyous Regyment"—might truthfully be applied to some of the bulky popular "Outlines" of today. Probably even harsher terms have been applied by our impatient critics, but none quite so satisfying. Such popular treatises, however, serve their purpose, and Boorde's are no exception, for his "Introduction of Knowledge" was one of the popular books of the sixteenth century. As another doctor who loved "myrth", Oliver Wendell Holmes, said on one occasion, what would be the state of the highways of life if we did not drive our thought-sprinklers through them occasionally with the valves open?

In his works, popular though their aim, Boorde writes with the native English genius for language. He lived in a time when one single robust word could hit the bull clean in the eye, and the

business was done. No pottering about with mincing words and apologetic coughs, with the eyes turned hopefully at what one wanted to suggest but balked at saying for reasons of propriety. Boorde is one of the jolly company of the more obscure writers of England who came from the common people—the semi-Villons if you will—who spoke the language of the people, had a great zest for life, and whose writings are redolent of their time. Men like gay Tim Bobbin of Lancashire who came later, and who set it down that his wife was "Dutch built and required room". Nothing queasy about their stomachs, always ready for a flutter with the lads, wielding their cudgels with an honest thwack. Boorde, of course, has less wit and ribaldry than others of this group, but he was a shrewd observer and a diligent scribbler. If at the same time he betrayed in his scribbling a very human impulse to get on in the world, we may fairly forgive him.

Boorde's books are among the earliest medical works written in English. Let this use of his native tongue be counted to him for righteousness. His Latin is used sparingly and in its pedantry is surprising in a man who was trained as a monk. It is not the easy colloquial mediæval Latin which, as Wyndham Lewis exclaims, is "a better international language than the synthetic twitterings in 'O' which dim persons in pince-nez try to fob off on our own apathetic age".

Of bits of the splendid mediæval Latin poetry there is nothing to be found in Boorde's writing. And yet a great body of this poetry must have been known at the time. One is reminded of a poem such as the following:—

"An amor dolor sit,
An dolor amor sit,
Utrumque nescio,
Hoc unum sentio—
Jocundus dolor est
Si dolor amor est."*

And (for the pleasure of quotation) of Professor Saintsbury's accompanying footnote which should find some echoing response in the souls of physicians whose professional forbears used the language more easily than we do today.

"I do not know in what other language to find such a combination of neatness and sweetness in phrase, of terseness and unmonotonous tautology in words, of simplicity and poignancy in music."

But Boorde was no poet. I suspect that in his blunt way, like John Locke, who lived a century later, he felt that "it is very seldom seen that anyone discovers mines of gold or silver on Parnassus. It is a pleasant air, but a barren soil; and there are very few instances of those who have added to their patrimony by anything they have reaped from thence." Boorde was a strict realist, concerned with the world about him. For he sets it down, "a man hath reason with Angelles, felynge with beastes, lyunge with trees, beyng with stones".

THE LIFE OF BOORDE

I have been a looker on in the Cockpit of Learning these many years.—(Roger Ascham).

Andrew Boorde was born about 1490 at Boord's Hill near Cuckfield in Sussex, England, and was brought up at Oxford. We know very little about his early years except what may be gained from a few references in his letters and his books. He was received into the order of the Carthusian monks while still under age, a circumstance that plagued him all his life and finally brought about his downfall. In 1521 he was appointed Suffragan Bishop of Chichester, although he apparently never acted in that office. Unable to endure the "rugorosyte" of the Order, about 1528 he received from his Prior dispensation from his religious vows and straightway went abroad where he travelled extensively and studied medicine, as he puts it, "trauelled for to haue the notycyon and practes of Physycke in diuers regyons and countres". He returned to England in 1530, began practice, and attended the Duke of Norfolk. He again went on a continental tour, visiting the universities at Orleans, Poictiers, Toulouse and Montpellier in France and Wittenberg in Germany. His favourite university was Montpellier, "the most nobilist uniuersite of the world for phisicians and surgions". Montpellier at this time enjoyed the highest reputation as a centre of medical teaching, rivalling Paris. It is interesting to recall that François Rabelais entered the school as a student in 1530 and by 1537 was giving lectures upon Hippocrates in the original Greek. Boorde makes no mention of his name.

Returning to England in the summer of 1534, during the tumult of the Reformation, we find Boorde taking the oath of conformity to Henry VIII'S supremacy in the London Charterhouse of his Order. He seems to have got into some trouble there, and was kept in close confinement until released by Thomas Cromwell who had been a former patient. Late in 1534 he went abroad again as an agent of Cromwell to report

*The English version of these lines by F. S. Flint runs thus.

"Whether love be pain,
Or pain love be,
I have no leisure
To inquire. To me
The pain is pleasure
If love pain be.

And if I love her,
And she be pain,
Would I recover
And love the pain
And be no lover
And whole again?

No, I must cherish
Her, come what may,
Although I perish
From day to day:
While the love I cherish,
The pain can stay."

on the state of feeling in Europe towards Henry's policies. He travelled in France and Spain, sending letters to Cromwell and visiting various medical schools. These despatches to Cromwell he signed "your bedman, Andrew Bord, prest". He was taken ill during this mission, but shortly after his recovery returned to England where one of his first activities was to have Cromwell confirm his freedom from his religious vows as a monk of the Carthusian order.

In 1536 he went to Scotland to practise and to study medicine "in a lytle unyuersyte or study namyd Glasco". Here he spent nearly a year, hated as an Englishman, but tolerated because of his medical knowledge. His opinion of the Scots he sets down in one of his despatches to Cromwell: "Shortly to conclude, trust you no Skott, for they wyll youse flatteryng werdes, and all ys falsholde". In 1537 he moved to Yorkshire, where he had two horses stolen and applied to Cromwell for assistance in recovering them.

In 1538 after the dissolution of the religious houses, Boorde, now assured of his freedom, went abroad for the fourth time. His itinerary was an extensive one, visiting France, Flanders Germany, Denmark, Venice, then on to Rhodes, Joppa and Jerusalem, returning through Naples and Rome, to settle in his beloved university town of Montpellier. Here he began to write and by 1542 had written "The First Book of the Introduction of Knowledge", which, as we have noted, is the first printed travel handbook of Europe, "The Dyetary of Helth", "The Breuyary of Helth" and the "Treatise upon Beards".

He returned to England in 1542, when the first edition of the "Dyetary" was published, and resumed practice in Winchester, where he was left property by his brother. Here he interested himself in astronomy, writing "A Pronostycacyon" in 1545 and "The Pryncyples of Astronamye". We find him living for a time in London in 1547 in St. Giles, probably to superintend the printing of his books.

And then occurred the startling series of events which brought Boorde's life to an inglorious close. In 1547 or early in the following year charges were preferred against him by John Ponet, Bishop of Winchester, his own diocese, that Boorde maintained three women in his chambers for his own use and for the use of other priests. Boorde was brought before the justices of the cathedral city and the harlots were shown in the streets. The documents dealing with the charge are somewhat involved and reflect the bitter ecclesiastical controversies of the time. None the less on the evidence it is fairly certain that Boorde fell to the sin of lechery. Whatever the truth of the business, it is regrettable that we have no words of Boorde concerning the whole matter As one commentator has pointed out, with charity, "the way of a man with a maid" is one of the four things that Agur, the son of Jakeh, knew not. And Boorde himself in writing of the weaknesses of man states that "it is hard to get out of the flesh what is bred in the bone". In any event, because of this offence or some other misdemeanor, the closing scene finds Boorde in the Fleet prison in London, a sick man. He made his will on April 11, 1549, and died soon afterwards, the will being proved on April 25th of the same year. Bishop Bale, writing in 1557, says that he poisoned himself to save public shame, but what truth there is in this statement we do not know.

His will begins with these sentences.

> "In the name of God, Amen. The yere of our lord God, a Thousande five hundred ffortie and nyne, the xjth daye of Aprill, I, Andrewe Boord of Wynchester, in Hamshire, Doctour of Phisike, being in the closse wardes of the Flete, prisoner in London, hole in mynde and sick in body, make this my last will in manner and forme following. First, I bequeth my soule to Almyghtie God, and my bodie to be buried in erthe, where yt shall please my Executour."

There follows a list of bequests.

Modern moralists are hard put to it when assessing the life of a man of the sixteenth century. Piety, a zest for life, unabashed animalism and coarseness jostle each other, and the good and bad stand forth patent and unashamed. Boorde who made no claim to virtue and who sought from his early manhood to discard the hair shirt of the monk for the more licensed robe of the physician would ask to be judged by nothing more than his works. We have been already overlong in coming to these—they are the authentic Boorde.

THE WORKS OF BOORDE

> In books cherubim expand their wings, that the soul of the student may ascend and look around from pole to pole, from the rising and the setting sun, from the north and from the sea. In them the most high and incomprehensible God himself is contained and worshipped.
> —(Richard de Bury: "Philobiblon").

The questing spirit of Boorde, if it still interests itself in a world that is as tumultuous as the age of Henry VIII in which he lived, must have been mightily pleased to see that in 1936 excerpts from "A Dyetary of Helth" were printed under the title "The Wisdom of Andrew Boorde" in a handsomely mounted book. After nearly four hundred years there is still recompense for the bitter hours spent in the Fleet prison.

In glancing through the works of Boorde, the reader must not expect to find a rich argosy of learning. To one familiar with the great prose writers of the age—Thomas More, Tyndale and Thomas Malory, the accents and the turns of language will be familiar. But the interest rather lies in the quaint passages and in the insight which they give us into the mind of a man of Middle England. It is not proposed to weary the reader by textual criticism or discussion of the various editions. In quotation the spelling has been modernized, unless for some special reason, to make for easier reading, but the text otherwise has been preserved

The three chief works of our versatile and chatty author are "The Fyrst Boke of the Introduction of Knowledge", "A Dyetary of Helth", and "The Breuyary of Helth". The "Introduction of Knowledge" was written in 1542 or after. It is dedicated to the Princess Mary, afterwards Queen. It was never completed in the form originally planned by Boorde. Appearing as a book of travel, he had intended that it should contain a section on anatomy and one on medicine. "A Dyetary of Helth" was published in 1542 or in the following year. "The Breuyary of Helth", also written before 1542, was probably first printed in 1547 but the first known edition is dated 1552. This book Boorde apparently intended as a sort of companion to the "Dyetary". It is an alphabetical list of diseases with their Latin names and the manner of treating them. In his preface to this book Boorde has the root of the matter in him and commends himself to us as a physician who knows the world and the traditions of his craft.



Fig. 1

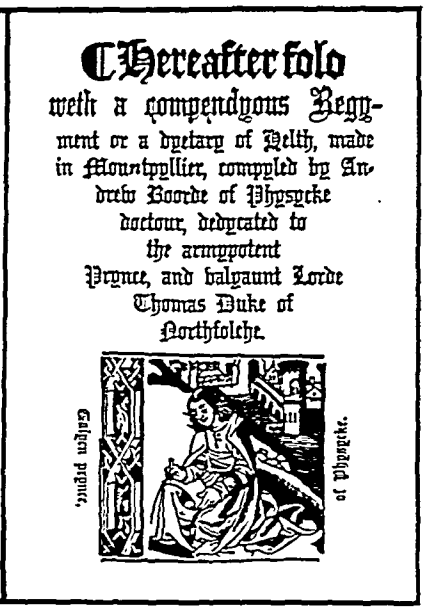


Fig. 2

Fig. 1.—The woodcut from the "Introduction", representing Andrew Boorde. This is an old cut of some one else with the upper corner cut out, and Boorde's name let down into it. No authentic portrait of Boorde exists. Fig. 2.—Title page of Boorde's "Dyetary of Helth", 1542 edition.

"Gentle readers, I have taken some pain in making this book, to do sick men pleasure, and whole men profit, that sick men may recuperate their health, and whole men may preserve themselves from sickness (with God's help) as well as Physic as in Surgery . . . . And for as much as every man nowadays is desirous to read brief and compendious matters, I, therefore, in this matter pretend to satisfy men's minds as much as I can, naming this book according to the matter, which is 'The Breviary of Health' . . . . Howbeit, in this matter, I do set God before mine eyes, and charity, considering that I do write this book for a common wealth, as God knoweth my pretence, not only in making this book, but all other books that I have made, that I did never look for no reward neither of lord, nor of printer, nor of no man living, nor I had never no reward, nor will never have none, as long as I do live, God helping me, whose perpetual and Fatherly blessing light on us all. Amen."

As the foreword to one of the earliest printed books on medicine in English this leaves little to be desired.

Other genuine works of Boorde which concern us less closely are "The Pryncyples of Astronamye", in which are set out many of the popular astrological ideas of the time; "The Peregrination of Doctor Boorde"; "A Prognostycacion". Three works which have been lost are "The Itinerary of Europe", "A Boke of Sermons" (a very considerable loss coming from a man with Boorde's shrewd mind), and "A Treatyse upon Berdes". All that we know of this last tract is to be obtained from a short pamphlet entitled "The Treatyse Answeryng the Boke of Berdes" by a writer named Barnes, in which, in doggerel verse, he maintains that Boorde was a noodle for condemning beards and advocating shaving. In his introduction Barnes relates an incident in Boorde's life which the more polite conventions of modern writing would handle less bluntly. The lighter side of medical student life has always been cultivated in a robust way, and Boorde, who hated water and loved good ale and wine, is in the tradition. Barnes writes:

"This story following was and is the occasion why you abhor beards, and that was this: at your last being in Montpellier, Martin the surgeon being there with you, and did accompany daily with none so much as with you: if you be remembered, he brought you to dinner upon a day to one Hans Smormowthe's house, a Dutchman, in which house you were cup-shot, otherwise called drunken, at which time your beard was long. So then your associate Martin brought you to bed. And with the removing, your stomach turned, and so you vomited in his bosom; howbeit, as much as your beard might hold, upon your beard remained until the next day in the morning. And when you waked, and smelled your own beard, you fell to it afresh; and calling for your friend Martin, showed him the cause of this last mischance. Whereupon you desired to shave you. And so, when you saw your beard, you said that it was a shameful thing on any man's face and so it is in such cases I not deny. Yet shall you consider, that our Englishmen, being in England, doth use to keep their beards much more clean."

THE INTRODUCTION OF KNOWLEDGE

For the contemplation of God's creatures and works produceth (having regard to the works and creatures themselves) knowledge, but having regard to God, no perfect knowledge, but wonder, which is broken knowledge.—(Francis Bacon).

"The Fyrst Boke of the Introduction of Knowledge" gives us Boorde as traveller and, as we would say nowadays, commentator. Men of his time were beginning to tour the continent, they were talking and reading about travel. More and more, travel was being reflected in the plays of the age. It should be remembered that the England which Boorde knew was still a small

country with a population probably less than four millions. But the currents of social change were moving rapidly, and although complaints abounded of gluttony, laziness and general impiety, life had not yet been stripped of its mystery, the world was still governed by "fortune" and not natural law, and there was an enormous joy in the mere act of living.

"It is a strange madness," says Petrarch, "this desire to be for ever sleeping in a strange bed". Our Master Andrew had this passion, and for his contemporaries he sets down in his book a group of facts about the countries of Europe and beyond, giving the general characteristics of each country in doggerel verse and following with some comments in prose, ending with specimens of the language spoken. He is fulsome in his praise of England as becomes an Englishman of his time—"the most regall realme of England is cytuated in an angle of the worlde, hauing no region in Chrystendom nor out of Chrystendom equiualent to it". Scotland is a country of boastful men who tell "strong lyes". In his section on Egypt Boorde gives us the first printed specimen of the Gypsy language. The value of the book, however, lies for the most part in its antiquarian interest. And as for Boorde himself, in his love of travel he bears out the truth of the old proverb, "To reach felicity you must cross the water".

THE DYETARY

His book contains plain matter under hard words.
—(Thomas Fuller, speaking of Boorde's book).

In the "Dyetary" Boorde sets out to tell his contemporaries just how to arrange their mode of living, how to lay out their houses, govern their households, what to eat and drink, and how to look after their health. It is a quaint and at times a jolly book, full of shrewd observation, odd bits and tags of medical advice, moralizing and common sense. Boorde's age found a solid satisfaction and great content in the more simple things of life, and it is this spirit that is reflected in his book. A countryman of the time speaks as follows: "With hay in the barn, horses in the stable, oxen in the stall, sheep in the pen, hogs in the sty, corn in the garner, cheese in the loft, milk in the dairy, cream in the pot, butter in the dish, ale in the tub, and Aqua Vitæ in the bottle, beef in the brine, brawn in the souse and bacon in the roof, herbs in the garden, and water at our doors, whole clothes to our backs, and some money in our coffers,—having all this, if we serve God with all, what in God's name can we desire to have more?" No necessity for any kind of credit here!

In the sixteenth century, too, the upper middle classes were becoming interested in their material surroundings. Life was beginning to be more comfortable. Sanitation was improving. Fireplaces with chimneys were introduced and were regarded as a sign of the degenerate times. "Now our tenderlings complain of rheums and catarrhs," scolds good Master Harrison, the antiquary in 1577. The bed was the most elaborate furnishing in the house of the gentleman, feather mattresses being used in which one literally sank to rest. People of means were giving more thought to their clothing. All these things Boorde gathered up in his little manual of living, writing like some small county Montaigne. To the "Dyetary" the Oxford English Dictionary traces the first or very early use of several general, as apart from medical, words.

In building a house, Boorde begins, it must be in a healthy district and command a fair prospect. "For my conceit is such, that I had rather not to build a mansion or a house, than to build one without a good prospect in it, to it, and from it. For and the eye be not satisfied, the mind can not be contented. And the mind can not be contented, the heart can not be pleased: if the heart and mind be not pleased, nature doth abhor." Reading what Boorde sets down with regard to sanitary arrangements corrects the ideas which we may have as to the knowledge of the time on such matters. A man should divide his income into three parts, Boorde counsels, one for food, one for dress, wages and alms, and one for urgent causes. For, he says, "he that is once behind and in trouble, he can not be in quickness of mind, the which doth perturb the heart, and so consequently doth shorten a man's life."

The household arrangements having been set in order, Boorde turns to other things.

"There is no Catholic or Christian man living, but he is bound in conscience to be more circumspect about the wealth of his soul than the health of his body. And also the head of a house must oversee that they the which be under his tuition serve God the holy days as diligently, yea, and more diligently than to do their work the several days, refraining them from vice and sin, compelling them to observe the commandments of God, specially to punish swearers, for in the whole world there is not such audible swearing as is used in England, specially among youth and children, which is a detestable thing to hear it, and no man doth go about to punish it."

In discussing the question of sleep, Boorde is at his best. Early rising was the custom of his age, servants rising at three and the work of the world being under way by five in the morning. It was held that "to rise with the lark and to go to bed with the lamb, so we have the break of day and the brightness of the sun to cheer our spirits". In our own time which has altered its habits in this particular it is still regarded by many as an essential part of morals to get up early in the morning, and they roundly deplore our decadence in late rising. I recall that one of our modern prophets of living, Chesterton, who had as much zest for life as Boorde and greater felicity in language, on one occasion paid his respects to all early risers in curt fashion: "Misers get up early in the morning; and burglars, I am informed, get up the night before".

Our master in living, Boorde, sets out in great detail his advice concerning sleep. Sleep moder-

ately, he says, for moderate sleep pleases God and excessive sleep leads a man to sin. Do not sleep during the day. Indulge in no venery early at night. Before bedtime be merry, have a fire in your bed-room, shut all the windows tightly, sleep on your right side, and lie with your head high. Then follows what I regard as the finest passage of Boorde's writings:

"Let your night-cap be of scarlet; and this I do advertise you, for to cause to be made a good thick quilt of cotton or else of pure flocks, or of clean wool, and let the covering of it be of white fustian, and lay it on the feather bed that you do lie on; and in your bed lie not too hot nor too cold, but in a temperance. Old ancient doctors of Physic saith, eight hours of sleep in summer, and nine hours of sleep in winter, is sufficient for any man, but I do think that sleep ought to be taken as the complexion of man is. *When you do rise in the morning, rise with mirth, and remember God.*"

The italics are mine. Very few writers have bettered that last sentence.

On food and drink our doctor writes wisely, leaving us in no doubt that it is our stomachs which should teach us the virtue of moderation. Do not drink water, unless it is mixed with wine, that "grand specific against dull dinners", as Oliver Wendell Holmes says. Ale is the natural drink for an Englishman. Beer "is a natural drink for a Dutchman. And now of late days it is much used in England to the detriment of many Englishmen; for the drink is a cold drink; yet it doth make a man fat and doth inflate the belly, as it doth appear by the Dutchmen's faces and bellies". Pork he objects to, "and in holy scripture it is not praised". All in all he says, the diet is of first importance in health. "For a good cook is half a physician. For the chief physic (the counsel of a physician except) doth come from the kitchen."

In his final chapters there is once more the refrain:

"A merry heart goes all the day,
Your sad tires in a mile-a."

"There is no man nor woman the which have any respect to them self that can be a better physician for their own safeguard than their own self can be, to consider what thing the which doth them good, and to refrain from such things that doth them hurt or harm. And let every man beware of care, sorrow, thought, pensifulness, and of inward anger. Beware of surfeits, and use not too much venerious acts. Break not the usual custom of sleep in the night. A merry heart and mind, the which is in rest and quietness, without adversity and too much worldly business, causeth a man to live long, and to look youngly, although he be aged. Care and sorrow bringeth in age and death, wherefore let every man be merry; and if he can not, let him resort to merry company to break of his perplexities."

THE BREVIARY AND BOORDE'S MEDICAL OPINIONS

A good Physitian comes to thee with the shape of an Angell, and therefore let him boldly take thee by the hand, for he has been in God's garden, gathering herbes. (Thomas Dekker).

In medical matters Boorde, while following the cardinal teachings of Hippocrates and Galen, reflects the more practical and empirical spirit of Montpellier. It is significant that, while setting down the ideas of the ancients, in the last analysis he bases his judgments on experience. In most matters he shows good common sense and is most successful in the advice which he gives on general matters of illness.

He sensibly advises the layman not to magnify minor illnesses and rush to the doctor. "I would not counsel a man for every trifling sickness to go to Physic or Surgery: let nature operate in such matters in expelling such humours, and meddle no further." At the same time in illness the physician's orders should be followed without question, "for Saint Augustine saith, 'he that doth not the commandment of his physician, doth kill himself'." Boorde has the sympathy of every doctor in another bit of advice, for what physician has not groaned under the inroads which visitors make on a patient's strength and well-being? On this matter of visitors in the sick-room, Boorde says bluntly, "And in any wise let not many men, and specially women, be together at one time in the chamber, not only for babbling, but specially for their breaths". The reference to women in the foregoing sentence is rather characteristic of Boorde's writings about the female sex which are always direct and tempered by his experience. In another place, speaking of woman, he says, "Mulier is the Latin word. In English it is named a woman; first, when a woman was made of God, she was named a Virago because she did come of a man, as it doth appear in the second chapter of Genesis." When it comes to getting along with women, he goes on,

"Physic cannot help this matter, but only God and great sickness may subdue this matter and no man else . . . . Let every man please his wife in all matters, and displease her not, but let her have her own will, for that she will have, whosoever say nay . . . . Let every man please his wife, and beat her not, but let her have her own will, as I have said."

It is notable that in surveying what he regards as the evils prevalent in England, Boorde with the eye of a physician mentions two which concern medical practice. He complains of seven evils—the neglect of fasting, the prevalence of swearing and heresies, the laziness of young people, the want of training for midwives, cobblers being physicians, the mutability of men's minds, and the lust and avarice of men. For the laziness of the young his advice is direct and practical—"Take me a stick or wand of a yard of length or more, and let it be as great as a man's finger, and with it anoint the back and the shoulders well, morning and evening, and do this for 21 days; and if this habit will not be helped in that time let them beware of wagging in the gallows."

"The Breuyary" is a store-house of quaint medical opinion. A few quotations will serve as examples, ancient dogma uneasily rubbing shoulders with current practice. Of carcinoma Boorde has a curious note, "Carcinoma is the Greek word. In English it is named the sickness of the prison. And some authors doth say that it is a Canker, the which doth corrode and eat the superficial parts of the body, but I do take

it for the sickness of the prison." Our author is no charlatan and pays his respects to the uroscopy practices of his day. "There is not the wisest physician living, but that I (being a whole man) may deceive him by my urine . . . and this I do say, as for the colours of urines, urine is a strumpet or a harlot, and in it many physicians may be deceived." Of lousiness: "Pediculacio or Morbus pediculorum be the Latin words. In Greek it is named Phthiriasis. In English it is named lousiness, and there be three kinds, which be to say, head lice, body lice, crab lice, and nits. This impediment doth come by—not changing of a man's shirt or else lying in a lousy bed."

Of itch: "Prurigo is the Latin word. In English it is named itching of a man's body, skin or flesh. This impediment doth come of evil blood, the which would be out of the flesh.—A remedy. This I do advertise every man, for this matter to ordain or prepare a good pair of nails, to scratch and claw, and to rent and tear the skin and the flesh, that the corrupt blood may run out of the flesh." For priapism Boorde's treatment is direct enough: "A remedy for that is to leap into a great vessel of cold water, or to put nettles about the yard and stones."

On wounds, after describing the various types of wounds, Boorde states the cause most commonly comes through harlots, riding to hounds, quarrelling or drunkenness. The remedy: "If it be a green wound, first staunch the blood; and if the wound be large and wide, stitch it, and after that lay a plaster, and let it lie 20 hour or more, then it, open and mundify it with white wine. And if the wound be deep, use siccative plasters made with olibanum, frankincense, literge, yreos, the bran of bones and such like. If the wounds be indifferent, the wound mundified, use the powder of myrtles and rose leaves, and such like; and let the patient beware of venerious acts and of contagious meats and drinks."

One of his remedies, among many, for asthma is to anoint the stomach with the oil of philosophers, named in Latin Oleum philosophorum. In our own age when the treatment of asthma is still so frequently empirical and then not always very successful, invoking a philosophical outlook is not a bad plan, if not an ultimate necessity. In discussing pain which Amiel has so aptly called the small change of death, Boorde has only counsel to give the patient. "Let him arm himself with patience, and evermore thank God whatsoever is sent to man; for if adversity do come, it is either sent to punish man for sin, or else probation; and with sorrow use honest mirth and good company." Boorde in his writings continually uses the word "mirth". Because it is the very centre of his philosophy of life, our last quotation concerns it, defining what Boorde means when he talks about mirth.

"There is nothing that doth comfort the heart so much, beside God, as honest mirth and good company. —Mirth cometh many ways: the principal mirth is when a man live out of deadly sin, and not in grudge of conscience in this world, and that every man doth rejoice in God, and in charity to his neighbor.—Laudable mirth is, one man or one neighbor to be merry with another, with honesty and virtue, without swearing and slandering, and ribaldry speaking. Mirth is in musical instruments, and ghostly and Godly singing; mirth is when a man liveth out of debt, and may have meat and drink and cloth, although he have never a penny in his purse."

IN CONCLUSION

For a physician who is a lover of wisdom is the equal of a god.—(Hippocrates).

The small fry which we set out to consider has grown so rapidly that it threatens to become a leviathan. If the reader has groaned at the number and length of the quoted passages, it can only be said that in these extracts will be found the essential Boorde, talkative, shrewd, pious, observant, with a turn for phrasing and a love of moralizing. It has been said that philosophy and medicine are as far remote from each other as are the boundaries of any Mysians and Phrygians. But in Boorde (who would not have understood this distinction) the elements of both are so mixed that the man of today, assured in his knowledge of medicine but credulous among the wandering lights of philosophy, is so puzzled that he must needs fall back on the term 'quaint' to describe such an oracle. And so Andrew Boorde comes down to posterity labelled neither 'Andrew Boorde, priest' nor 'Andrew Boorde, doctor of physic' but simply 'quaint Andrew Boorde'. Such is the modern judgment of our literary doctor. Boorde, whatever we may think of him, was one who was not willing to exist under a "naked nomination", and therefore with a wry face he has had to content himself with this doubtful description of 'quaint' for at least it has given him his small measure of immortality. As a physician he was no grasping empiric or "mounti-bancking Quacksalver" but in his day and generation a learned physician. But he was more than a physician. And if in our last analysis we cancel out the word at which moderns cavil—philosophy, and substitute the word wisdom, Boorde may achieve in our eyes a greater stature. Physic in his estimation concerned itself not only with disease but with the way in which a man can best live his life. The secret of living to him was a love of "myrth". To physicians and laymen alike he wrote down his credo—"Myrth is one of the chefest thynges of physycke".

In one of the noblest passages in modern prose Mr. Santayana has laid it down that what governs the Englishman is his inner atmosphere, "the weather in his soul", which broods at a deeper level than language and is a religion behind religion. On occasion this deeply rooted instinct has expressed itself in words as varied as those of the courteous Sidney, the stately Thomas Browne, and the sober Milton. In his humble way our sturdy old Tudor doctor, Andrew Boorde, Englishman, found his delight and the weather in his soul as the love of "honeste myrthe".

Association Notes

THE SIXTY-NINTH ANNUAL MEETING OF THE CANADIAN MEDICAL ASSOCIATION, IN CONJUNCTION WITH THE ANNUAL MEETING OF THE MEDICAL SOCIETY OF NOVA SCOTIA, TO BE HELD IN HALIFAX, JUNE 20, 21, 22, 23, 24, 1938

Convention Headquarters, Nova Scotian Hotel

The Canadian Medical Association

President, T. H. LEGGETT, Ottawa;
President-elect, K. A. MACKENZIE, Halifax;
General Secretary, T. C. ROUTLEY, Toronto.

Medical Society of Nova Scotia

President, A. CALDER, Glace Bay;
Secretary, H. G. GRANT, Halifax.

REVISED PROGRAM

Monday, June 20th

9.00 a.m.—Registration.
9.30 a.m.—Meeting of the General Council.
12.30 p.m.—Luncheon.
2.00 p.m.—Meeting of the General Council.
6.00 p.m.—Meeting of the Nominating Committee.

Tuesday, June 21st

9.30 a.m.—Meeting of the General Council.
12.30 p.m.—Luncheon.
2.00 p.m.—Meeting of the General Council.
7.00 p.m.—Dinner to General Council.

Wednesday, June 22nd

8.30 a.m.—Registration.
9.00 a.m.—General Session.
12.30 p.m.—Luncheon.
2.00 p.m.—Sectional Meetings.
8.30 p.m.—Annual General Meeting.

Thursday, June 23rd

8.30 a.m.—Registration.
9.00 a.m.—Sectional Meetings.
12.30 p.m.—Luncheon, followed by Annual Meeting of the Canadian Medical Protective Association.
2.00 p.m.—General Session.
2.00 p.m.—Meeting of Incoming Executive Committee.
7.30 p.m.—Dinner, Nova Scotia Medical Society.

Friday, June 24th

8.30 a.m.—Registration.
9.00 a.m.—General Session.
12.00 a.m.—Luncheon.
1.00 p.m.—Annual Golf Tournament.

Friday, June 24th—*Continued*

7.30 p.m.—Dinner, followed by presentation of prizes to winners at the Golf Tournament.
Alumni Dinners for those desiring to arrange them.

GENERAL SESSIONS

Wednesday, June 22nd

9.00 a.m.—

Symposium on poliomyelitis.—Drs. J. T. Phair, Alan Brown, D. E. Robertson, all of Toronto.

The Osler Lecture.—"Osler, the last phase, and his influence on medicine."—Sir Humphry Rolleston, Bart., Surrey, England.

Surgical clinic on cancer.—Drs. M. R. MacCharles, Winnipeg and William Boyd, Toronto.

Thursday, June 23rd

2.00 p.m.—

Address of the President, Dr. T. H. Leggett, Ottawa.

Treatment of cardiac emergencies.—Dr. G. F. Strong, Vancouver.

Leukoplakia and allied mouth conditions.—Dr. Douglas Quick, New York.

Benign lesions of the œsophagus.—Dr. E. E. Cleaver, Toronto.

Diagnosis of local lesions of the spinal cord.—Dr. Fred H. McKay, Montreal.

Friday, June 24th

9.00 a.m.—

Symposium on streptococcic sore throat; epidemiology, bacteriology and treatment.—Drs. A. L. McLean, Halifax, W. J. Deadman, Hamilton, P. B. Macfarlane, Hamilton.

Friday, June 24th—*Continued*

Spinal cord tumours.—Dr. A. W. Adson, Mayo Clinic, Rochester.

Observations on five hundred pre-eclamptics. —Dr. F. C. Irving, Boston.

Medical Clinic.—Dr. J. C. Meakins, Montreal.

SECTIONAL MEETINGS

Section of Anæsthesia

WEDNESDAY, JUNE 22ND

2.00 p.m.—

Improving our anæsthesia services.—Dr. E. W. Lunney, Saint John.

The selection of the anæsthetic.—Dr. Lincoln F. Sise, Lahey Clinic, Boston.

FORS CLAVIGERA in anæsthesia. — Dr. Wesley Bourne, Montreal.

Anæsthetic complications arising from reflex reactions during abdominal surgery.—Dr. E. A. Rovenstine, New York.

A comparison of ether, spinal and cyclopropane anæsthesia.—Dr. J. C. Houston, Charlottetown.

Section of Medicine

WEDNESDAY, JUNE 22ND

2.00 p.m.—

The complications of acute hæmorrhagic nephritis with report of a case.—Dr. L. C. Montgomery, Montreal.

The results of phrenic nerve paralysis in the treatment of pulmonary tuberculosis — a study of 250 cases. — Dr. A. F. Miller, Kentville.

The complications of diabetes mellitus with special reference to their cause and prevention.—Dr. A. A. Fletcher, Toronto.

Illness other than diabetic complications, in insulin patients. — Dr. A. F. VanWart, Fredericton.

THURSDAY, JUNE 23RD

9.00 a.m.—

Interpretation of the factor of latency in syphilis.—Drs. Frank E. Cormia and John A. Lewis, Montreal.

Unrecognized hypothyroidism. — Dr. G. K. Wharton, London.

Mental complications of heart disease.—Dr. A. H. Gordon, Montreal.

Roentgenology of the heart and great vessels.— Dr. J. H. Palmer, Montreal.

The major forms of hereditary ectodermal dystrophy (lantern slides). — Dr. H. R. Clouston, Huntingdon.

Section of Obstetrics and Gynæcology

THURSDAY, JUNE 23RD

9.00 a.m.—

Diagnosis and treatment of common menstrual disorders.—Dr. E. V. Shute, London.

The prophylaxis and treatment of puerperal infection.—Dr. John Fraser, Montreal.

The indications for Cæsarean section.—Dr. Ross Mitchell, Winnipeg.

Human sterility.—Dr. W. P. Tew, London.

An eleven-year study of the prenatal clinic of the Dalhousie Public Health Clinic.—Drs. W. G. Colwell and A. L. McLean, Halifax.

Etiological factors and treatment of cancer of the cervix.—Dr. P. J. Kearns, Montreal.

Section of Ophthalmology and Oto-Laryngology

WEDNESDAY, JUNE 22ND

2.00 p.m.—

Tonsillectomy under intravenous anæsthesia in children suffering from chronic respiratory diseases.—Dr. Keith Hutchison, Montreal.

Bronchiectasis and tuberculosis in relation to nasal sinusitis.—Drs. L. DeV. Chipman and R. J. Collins, Saint John.

Carcinoma of the nasal accessory sinuses.—Dr. D. H. Ballon, Montreal.

Brain abscess.—Dr. William V. Cone, Montreal.

THURSDAY, JUNE 23RD

9.00 a.m.—

A comparison of hæmorrhage, blood picture and blood pressure, with ether, nitrous oxide and cyclopropane anæsthesia, in 100 ear, nose and throat operations. — Dr. L. R. Teasdale, Montreal.

A clinical lecture on hoarseness (coloured lantern slides). — Dr. Perry Goldsmith, Toronto.

Some problems in the diagnosis and treatment of glaucoma.—Dr. W. G. M. Byers, Montreal.

Asthenopia.—Dr. J. F. A. Johnston, Toronto.

2.00 p.m.—

The use of urea and caroid in chronic otitis media.—Dr. G. E. Tremble, Montreal.

Facial paralysis complicating the mastoid operation, and how to avoid it (lantern slides). —Dr. J. A. Sullivan, Toronto.

Physiology of the internal ear. Vertigo of otitic origin, its diagnosis, treatment, and demonstration of tests.—Dr. W. J. McNally, Montreal.

Thursday, June 23rd—*Continued*

The neurological aspect of oto-laryngological complaints.—Dr. E. F. Brooks, Toronto.

Severe hæmorrhage from the naso-pharynx.—Dr. B. V. Bradley, Toronto.

Section of Pædiatrics

WEDNESDAY, JUNE 22ND

2.00 p.m.—

Otitis media from the pædiatric viewpoint.—Dr. Geo. Campbell, Ottawa.

Some common pædiatric conditions frequently mishandled.—Dr. Alan Brown, Toronto.

Allergy in childhood.—Dr. T. M. Sieniewicz, Halifax.

The diagnosis of heart conditions in early childhood.—Dr. A. P. Hart, Toronto.

Anæmia in infancy.—Dr. N. B. Coward, Halifax.

Section of Radiology

WEDNESDAY, JUNE 22ND

2.00 p.m.—

A re-evaluation of roentgen technique and diagnosis in the study of pulmonary disease.—Dr. E. A. Petrie, Saint John.

Carcinoma of the sigmoid colon—a radiological study.—Drs. A. C. Singleton and M. M. R. Hall, Toronto.

The roentgen-ray appearance of intussuscepted tumours of the colon, with and without barium examination.—Dr. Richard Schatski, Boston.

X-ray therapy.—Dr. J. E. Gendreau, Montreal.

THURSDAY, JUNE 23RD

9.00 a.m.—

Radiological investigation of diseases in the region of the hypopharynx.—Dr. E. H. Shannon, Toronto.

The rôle of radiology in the diagnosis and treatment of the primary and secondary lesions of carcinoma of the breast.—Drs. W. A. Jones and R. C. Burr, Kingston.

Lipiodo-bronchography.—Drs. J. Gosselin and J. E. Perron, Quebec.

Bone tumours.—Dr. C. M. Jones, Halifax.

Section of Rheumatic Diseases

THURSDAY, JUNE 23RD

9.00 a.m.—

The clinical approach to the rheumatic diseases.—Dr. A. A. Fletcher, Toronto.

The aims and objects of the Canadian Rheumatic Disease Association.—Dr. W. S. Barnhart, Ottawa.

Thursday, June 23rd—*Continued*

Rheumatic fever.—Dr. J. C. Meakins, Montreal.

Diagnosis of chronic arthritis.—Dr. J. W. Merritt, Halifax.

The management of rheumatoid arthritis.—Dr. G. Douglas Taylor, Montreal.

A short business session of the Canadian Rheumatic Disease Association will be held immediately at the close of this program.

Section of Surgery

WEDNESDAY, JUNE 22ND

2.00 p.m.—

The Band operation.—A detailed description of its technique (lantern slides).—Dr. W. O. Bigelow, Brandon, Man.

Fracture of the neck of the femur.—Dr. W. E. Gallie, Toronto.

Fractures of the morphological neck of the humerus in children.—Dr. L. J. Austin, Kingston.

Bursitis.—Dr. H. K. MacDonald, Halifax.

Fracture of the jaw. — Dr. Fulton Risdon, Toronto.

THURSDAY, JUNE 23RD

9.00 a.m.—

Extrapleural pneumothorax.—Dr. C. A. McIntosh, Montreal.

Duodenal ulcer. — Dr. Roscoe R. Graham, Toronto.

Carcinoma of the breast.—Dr. J. G. MacDougall, Halifax.

Diagnosis and treatment of peripheral arterial disease.—Dr. H. M. Elder, Montreal.

Heparin and thrombosis.—Dr. D. W. G. Murray, Toronto.

Some remarks on ligaments.—Dr. D. Mainland, Halifax.

Section of Urology

WEDNESDAY, JUNE 22ND

2.00 p.m.—

Horseshoe kidney.—Dr. K. P. J. Hayes, Halifax.

Principles of the treatment of urinary infections by medication.—Dr. D. R. Mitchell, Toronto.

Recurrent pyelitis in women.—Dr. S. A. Wallace, Kamloops.

Common surgical conditions of the female bladder neck.—Dr. Magnus I. Seng, Montreal.

Ureteral calculus: clinical analysis of 200 cases.—Dr. Colin Chisholm, Toronto.

THURSDAY, JUNE 23RD

9.00 a.m.—

Surgical treatment of hydronephrosis.—Dr. C. B. Stewart, Winnipeg.

Disturbances of function of the bladder neck following prostatectomy.—Dr. F. G. Mack, Halifax.

Cysts of the kidney.—Drs. F. S. Patch and Lorne G. Wood, Montreal (by invitation).

Chronic prostatitis (non-specific).—Dr. Earle R. Hall, Vancouver.

Aberrant renal vessels: report of two cases (lantern slides).—Dr. Gordon A. Winfield, Halifax.

Lymphogranuloma inguinale.—Dr. Donald S. Mitchell, Montreal.

ENTERTAINMENT PROGRAM

Canadian Medical Association Members

MONDAY, JUNE 20TH

12.30 p.m.—Luncheon: Nova Scotian Hotel. Speaker: Dr. J. S. Martell.

TUESDAY, JUNE 21ST

12.30 p.m.—Luncheon: Nova Scotian Hotel. Speaker: Rev. Stanley Walker. President of King's University.

7.30 p.m.—Canadian Public Health Association Dinner, at which the members of the Council of the Canadian Medical Association will be guests. Lord Nelson Hotel.

WEDNESDAY, JUNE 22ND

12.30 p.m.—Luncheon: Nova Scotian Hotel. Speaker: Hon. Angus L. McDonald, Premier of Nova Scotia.

2.25 p.m.—Harbour Excursion.

8.30 p.m.—Annual Meeting. Inauguration of the new President. President's Reception and Dance. The Nova Scotian Hotel.

THURSDAY, JUNE 23RD

12.30 p.m.—Luncheon: The Nova Scotian Hotel. Speaker: Prof. Vincent McDonald, Dean of the Dalhousie Law School.

4.00 p.m.—Garden Party: Government House.

7.30 p.m.—Annual Meeting and Dinner of the Medical Society of Nova Scotia. Nova Scotian Hotel.

FRIDAY, JUNE 24TH

12.30 p.m.—Luncheon: The Nova Scotian Hotel. Speaker: Dr. Carleton Stanley, President of Dalhousie University.

2.00 p.m.—Golf Tournament at Ashburn Golf Club.

7.30 p.m.—Dinner at Ashburn Golf Club.

Ladies

MONDAY, JUNE 20TH

9.00 a.m.—*Registration.*

4.00 p.m.—Tea and Reception for ladies attending Canadian Public Health Association and Canadian Medical Association. Lord Nelson Hotel.

TUESDAY, JUNE 21ST

9.00 a.m.—Registration.

10.00 a.m.—Drive to Waverley via Waverley Lakes and Bedford Basin.

11.30 a.m.—Coffee at Green Acres.

4.00 p.m.—Tea at Doctor and Mrs. Mathers'. "Fintamara".

8.00 p.m.—Dinner at Nova Scotian Hotel.

WEDNESDAY, JUNE 22ND

9.00 a.m.—Registration.

10.00 a.m.—Drives to points of interest.

2.25 p.m.—Excursion—Halifax Harbour, Bedford Basin, Northwest Arm.

9.00 p.m.—Ceremonial, Canadian Medical Association. President's Reception and Dance—Nova Scotian Hotel.

THURSDAY, JUNE 23RD

12.30 p.m.—Buffet Luncheon at Ashburn Golf Club.

4.00 p.m.—Garden Party at Government House.

FRIDAY, JUNE 24TH

10.30 a.m.—Yachting, Golf, etc.

2.00 p.m.—Shore Drive, Airport, Brightwood, or Golf at Brightwood Club, Dartmouth.

4.30 p.m.—Tea at Brightwood Golf Club.

Young People

TUESDAY, JUNE 21ST

10.00 a.m. to 5.00 p.m.—Waegwoltic Club: Boating, Yachting, Swimming. Tennis, Quoits, etc.

7.00 p.m.—Weiner Roast at Dingle, or Theatre Party.

WEDNESDAY, JUNE 22ND

10.00 a.m. to 12.00 noon.—Waegwoltic Club Activities.

12.30 p.m.—Luncheon at Waegwoltic Club.

2.25 p.m.—Harbour Excursion.

9.00 p.m.—President's Reception and Dance.

THURSDAY, JUNE 23RD

10.00 a.m. to 12.00 noon.—Waegwoltic Club Activities.

4.00 p.m.—Garden Party at Government House.

8.00 p.m.—Dance at Waegwoltic Club.

FRIDAY, JUNE 24TH

10.00 a.m. to 12.00 noon.—Waegwoltic Club Activities.

2.00 p.m.—Shore Drive.

4.30 p.m.—Tea-Dance at Brightwood Golf Club.

CONSTITUTION AND BY-LAWS APPLICABLE TO DIVISIONS

The following "Constitution and By-Laws" of the Canadian Medical Association, *applicable to Divisions,* as amended by the Committee on Legislation and By-Laws and the Executive Committee, is presented in the May and June issues of the *Journal* according to the rule of the existing Constitution of the Association, in order that it may be legally dealt with at the Annual Meeting in Halifax.

CONSTITUTION

ARTICLE I.—TITLE

This Association shall be known as The Canadian Medical Association, and when the French language is used, it shall be known as "L'Association Médicale Canadienne".

ARTICLE II.—OBJECTS

1. The promotion of health and the prevention of disease.

2. The improvement of medical services however rendered.

3. The maintenance of the integrity and honour of the medical profession.

4. The performance of such other lawful things as are incidental or conducive to the welfare of the public and of the medical and allied professions.

ARTICLE III.—ETHICS

The Code of Ethics of The Association (see Appendix*) shall be such as may be adopted by The Association from time to time. A copy shall be supplied to each member of The Association.

ARTICLE IV.—MEMBERSHIP

The Association shall be composed of ordinary members, members-at-large, senior, non-resident and honorary members, elected by the method set forth in the By-Laws.

ARTICLE V.—BRANCH ASSOCIATIONS

Each Provincial Medical Association, or the body representing organized medicine in a province and enjoying all the rights and privileges of a medical association may be recognized as a Branch Association, but any Branch Association, if it so desire, may change its relationship to The Canadian Medical Association and become a Division by the method set forth in the By-Laws. It shall then be known as The Canadian Medical Association (name of Province) Division.

ARTICLE VI.—AFFILIATED SOCIETIES

Any nationally or internationally organized medical, scientific, or sociological body may, subject to the approval of the General Council, become affiliated with The Canadian Medical Association. Affiliation shall be understood to imply the establishment of a friendly relationship with the affiliated organization. There shall be no obligation on the part of either party to the affiliation to sponsor policies or movements on the part of the other.

* The Appendix referred to in this draft is to be printed later.

ARTICLE VII.—MEETINGS

The meetings of The Association shall be held in whole or in part on such occasions as may be provided for in the By-Laws.

ARTICLE VIII.—OFFICERS

(*a*) The Patron.

(*b*) The elective officers of The Association shall be a President, a President-Elect, a Chairman of the General Council, and an Honorary-Treasurer.

(*c*) The appointive officers of The Association shall be a General Secretary and such other officers as may be appointed by the Executive Committee. The appointive officers shall have no voting power.

ARTICLE IX.—THE GENERAL COUNCIL

In so far as it relates to Divisions, the General Council shall consist of:—

(*a*) The officers of The Association.

(*b*) The President and Secretary of each Division.

(*c*) Delegates elected by Divisions including members of the Nominating Committee.

Each Division shall be entitled to elect five delegates to serve on the General Council for its membership in The Canadian Medical Association of fifty or less; one additional delegate for its membership from fifty-one to one hundred; one additional delegate for its membership from 101 to 300; and thereafter one delegate for every 300 above 300. One divisional representative on Council may be named by the Division as its nominee to the Nominating Committee of the Association.

(*d*) Chairmen and Secretaries of Committees of The Association.

(*e*) Chairmen and Secretaries of Sections of The Association.

(*f*) Past-Presidents of The Association.

(*g*) Two representatives of the Department of Pensions and National Health.

ARTICLE X.—COMMITTEES

The Committees shall be (*a*) Standing; (*b*) Special.

(*a*) The Executive Committee shall be elected by the General Council; the other standing committees shall be appointed by the Executive Committee.

The standing committees are as follows:—

1. The Executive Committee.
2. The Committee on Legislation.
3. The Committee on Medical Education.
4. The Post-Graduate Committee.
5. The Central Programme Committee.
6. The Committee on Constitution and By-Laws.
7. The Committee on Archives.
8. The Committee on Public Health.
9. The Committee on Ethics and Credentials.
10. The Committee on Economics.
11. The Committee on Pharmacy.
12. The Committee on Hospital Service.
13. The Cancer Committee.

(*b*) Special Committees may be appointed by—

(i) The President
(ii) The General Council
(iii) The Executive Committee
(iv) The Chairman of the General Council.

ARTICLE XI.—FUNDS

Funds for the purpose of The Association shall be raised in such manner as may be determined by the General Council.

ARTICLE XII.—THE ASSOCIATION YEAR

The Assoication year shall be the calendar year.

ARTICLE XIII.—AMENDMENTS

1. Notice of Motion by one or more members to amend the Constitution must be placed in the hands of the General Secretary six months before the date of the annual meeting.

2. Amendments may be proposed by the General Council, the Executive Committee, or the Committee on Constitution and By-Laws without notice of motion, but the proposed amendments shall be published in the *Journal* in two issues preceding the annual meeting.

3. The Constitution shall be amended by a two-thirds vote of the members of the General Council in session present and voting.

ARTICLE XIV.—PROVINCIAL AUTONOMY

No provision of the Constitution or By-Laws herein set forth shall interfere with the status of a Division as a provincial organization. As a provincial body it shall have complete control of its own affairs, and if it choose, may retain its present name, as well as being known as Canadian Medical Association (name of Province) Division.

BY-LAWS

CHAPTER I.—DIVISIONS

A Branch of The Canadian Medical Association may become a Division as outlined in Chapter V of the Constitution and enjoy all the rights and privileges of a Division in the following manner:—

1. By intimating to The Canadian Medical Association in writing that it desires to become a Division.

2. By agreeing to amend, where necessary, its Constitution and By-Laws to place them in harmony with the Constitution and By-Laws of this Association.

3. By agreeing to collect from all of its Divisional Members who desire to be members of The Canadian Medical Association such annual fee as may from time to time be set for membership and remit same to this Association.

4. By agreeing to take such steps as seem proper to the Division to increase membership in The Association.

CHAPTER II.—MEMBERSHIP

Section 1—Ordinary Members

Every Member in good standing in a Branch Association or a Division shall be automatically an ordinary Member of The Canadian Medical Association on payment of the annual fee as levied by the General Council.

Section 2—Members-at-Large

Any graduate in Medicine, residing in Canada, who is not a Member of a Branch Association or of a Division may be accepted as a Member-at-large of The Canadian Medical Association provided that, with his application, a certificate of approval from the executive body of the Branch Association or Division in the Province in which the applicant resides be furnished to the General Secretary. In the case of an applicant residing in Canada in a territory beyond the jurisdiction of a Branch Association or of a Division, the application must be endorsed by two Members of The Canadian Medical Association. Such Members shall be designated "Members-at-Large" and shall pay the annual fee as levied by the General Council.

Section 3—Senior Members

Any Member of The Association in good standing for the immediately preceding ten-year period who has attained the age of seventy years is eligible to be nominated for Senior Membership by any ordinary member of The Association, but may be elected only by the unanimous approval of the members of the General Council in session present and voting. Not more than ten such Senior Members may be elected in any one year. Senior Members shall enjoy all the rights and privileges of The Association, but shall not be required to pay any annual fee.

Section 4—Non-Resident Members

Non-Resident Members may be elected by the Executive Committee from regularly qualified practitioners residing outside of Canada. They shall be required to pay not more than seventy-five per cent of the annual fee for Members-at-Large.

Section 5—Honorary Members

Honorary Members may be nominated by any Member of The Association and shall be elected only by a unanimous vote of the General Council in session present and voting. Not more than five Honorary Members may be elected in any one year and at no time shall the list of living Honorary Members exceed twenty-five. Honorary Members shall enjoy all the rights and privileges of The Association, but shall not be required to pay any annual fee.

Section 6—Discipline of Members

Any Member failing to conform to the Constitution and By-Laws and/or Code of Ethics (see Appendix) shall be liable to censure, suspension or expulsion.

(*a*) Any Member whose annual fee is directly payable to The Canadian Medical Association and whose annual fee has not been paid on or before the 31st day of March of the current year, may, without prejudice to his liability to The Association, be suspended from all privileges of membership.

(*b*) Any Member who has been found guilty of unprofessional conduct may, upon representation of the facts to the General Council, be censured, suspended or expelled from The Canadian Medical Association.

Section 7—Restoration to Membership

A Member, suspended or expelled, shall not be restored to membership until all arrears of fees (if directly payable to The Canadian Medical Association) have been paid, or until such requirements as may be determined by The General Council or the Executive Committee have been met.

Section 8—Resignation from Membership

Membership in The Association shall automatically cease only on suspension, expulsion or death. Resignation may be effected by giving notice in writing to the Secretary of the Division not less than one month before the beginning of the calendar year; or in the case of a Member-at-Large by giving notice directly to the General Secretary of The Canadian Medical Association one month before the next annual fee is due.

Section 9—Registration at Meetings

No Member shall take part in the proceedings of The Canadian Medical Association or in the proceedings of any of the Sections thereof or attend any part of the meeting until he has properly registered. Only Members and invited guests are eligible to register and attend an annual meeting.

CHAPTER III.—GUESTS AND VISITORS

Section 1—Visitors from outside of Canada

Medical practitioners and other men of science residing outside of Canada may attend the annual meeting as guests of the President or of the General Council or as visitors when vouched for by the General Secretary. They shall register with the General Secretary without payment of fee and may, after proper introduction, be allowed to participate in discussions.

Section 2—Medical Students Attending Meetings

Any hospital intern or medical student, when properly vouched for, may be admitted as a guest to the scientific meetings but shall not be allowed to take part in any of the proceedings unless specially invited by the Committee on Programme to present a communication.

Section 3—Delegates from Affiliated Societies at Scientific Meetings.

Two delegates from each affiliated society, one only of whom is required to be a Member of this Association, may attend the scientific meetings.

Section 4—Delegates from Affiliated Societies at Meetings of General Council

Two delegates from each affiliated society, provided one delegate is a Member of this Association, may be invited by the Executive Committee to attend meetings of the General Council. They may, at the request of the Chairman, take part in the deliberations but shall have no voting power.

CHAPTER IV.—ANNUAL MEETINGS

Section 1—Time and Place of Meetings

The time and place of meetings shall be decided by the General Council or the Executive Committee, and shall be announced as early as possible.

Section 2—Arrangements for Annual Meetings

When The Canadian Medical Association meets in any province where there is a Division, the meeting of that Division for that year shall be for business purposes only. The local arrangements shall be under the direction of the Executive Committee of The Canadian Medical Association, which may enlist the assistance of the Division or one of its component societies. The Canadian Medical Association assumes full control of the proceedings of the meeting and of all financial obligations save entertainment.

Section 3—Type of Programme

The programme of the meeting may consist of business sessions, general and sectional scientific sessions, and any other sessions which may be decided upon by the Executive Committee.

Section 4—Presiding Officer

The President or some person designated by him shall preside at all general meetings.

Section 5—Rules of Order

The Rules of Order which govern the proceedings of the House of Commons of Canada shall be the guide for conducting all meetings of The Association.

CHAPTER V.—MEETINGS OF SECTIONS

Section 1—Sectional Scientific Sessions

The Executive Committee shall determine what scientific Sections shall hold sessions at any annual meeting.

Section 2—Appointment of Sectional Officers

The Chairman and Secretary for each scientific Section shall be appointed by the Executive Committee.

Section 3—Presiding Officers at Meetings of Sections

The Chairman of the Section, or some one designated by him, shall preside at all meetings of the Section.

Section 4—Duties of Secretaries of Sections

The Secretary of the Section shall keep a correct record of the transactions, and shall transmit it to the General Secretary for insertion in the Minute Book provided for the purpose.

CHAPTER VI.—OFFICERS AND EXECUTIVE COMMITTEE

Section 1—Appointment of Nominating Committee

(*a*) The General Council at its first session at the time of the annual meeting shall elect by ballot from among its members present a Nominating Committee of NINE not including the President who shall be *ex officio* a member of the Committee and Chairman thereof.

(*b*) Each Division in The Association is entitled to nominate one member to the Nominating Committee. Provided this nomination be made in writing to the General Secretary prior to the annual meeting and the delegate so nominated be present he shall be declared elected to membership on the Nominating Committee.

(*c*) Upon completion of the election of Divisional Representatives as provided for in clause (*b*) of this section any vacancies which remain shall be filled by nominations from the floor, and the candidates so nominated who receive the highest number of votes shall be declared elected. This election shall be decided on a single ballot and the Chairman of the General Council shall if necessary give the casting vote.

Section 2—Duties of Nominating Committee

The Nominating Committee shall meet on the day of its election and submit to a later session of the General Council:—

1. Nomination of the following officers of The Association; a President-Elect, a Chairman of the General Council and an Honorary-Treasurer.

2. Nomination of an Executive Committee which, in addition to those who are members *ex officio* (See Chapter VIII, Section 4), shall consist of thirteen members geographically distributed as follows; three shall be resident in each province in which an office of The Association is located and one shall be resident in each of the other provinces.

At its session, the Nominating Committee may receive in writing a Division's official nomination of a candidate or candidates for representation on the Executive Committee to which the Division is entitled. In the event of an official nomination being rejected by the Nominating Committee the reasons for such action shall be incorporated in its report to General Council.

3. Rules of Procedure.—The Committee shall be called to order by the President as Chairman of the Committee. In the absence of the President the General Secretary shall convene the Committee and request the Committee to select, by open vote, the Chairman. The Committee shall then proceed to carry out its duties by open vote. In case of a tie vote the Chairman shall have the casting vote in addition to the vote to which he is entitled as a member of the Committee. When called for, the report of the Committee shall be presented to the General Council by the General Secretary.

Section 3—Election of Officers and Executive Committee

When the report of the Nominating Committee has been received by the General Council in session other nominations may also be received from the floor. A ballot shall then be taken for each of the offices in turn and also for elective members of the Executive Committee by provinces.

CHAPTER VII.—DUTIES OF OFFICERS

Section 1—Duties of the President

The President shall preside at the general sessions of The Association and shall perform such duties as custom and parliamentary usage require. He shall deliver a presidential address. He shall be a member *ex officio* of all committees of The Association. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

Section 2—Duties of the President-Elect

The President-Elect shall be installed and shall assume the office of President at the General Annual Meeting next following his election to the office of President-Elect. He shall be a member *ex officio* of all committees of The Association. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

Section 3—Duties of the Chairman of the General Council

The Chairman of the General Council shall preside at all meetings of the General Council. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association. He shall be a member *ex officio* of all Committees.

Section 4—Duties of the Honorary-Treasurer

The Honorary-Treasurer shall be the custodian of all moneys, securities and deeds, which are the property of The Association.

He shall pay by cheque only. Such cheques shall be signed by two persons authorized to sign cheques of The Association and shall be covered by voucher.

He shall prepare an annual financial statement audited by a chartered accountant.

He shall furnish a suitable bond for the faithful discharge of his duties. The cost of the bond shall be borne by The Association.

He may receive for his services an honorarium to be determined by the General Council. He shall be reimbursed for his legitimate travelling expenses while engaged in the business of The Association.

He shall be a member *ex officio* of the Executive Committee.

Section 5—Duties of the General Secretary.

The General Secretary shall be the Secretary also of the General Council and of the Executive Committee of The Association. He shall also be a member *ex officio* of all Committees of The Association. He shall give due notice of the time and place of all annual and special general meetings, by publishing the same in the official *Journal* of The Association or, if necessary, by notice to each member. He shall keep the minutes of the meetings of the General Council and of the Executive Committee in separate books and shall provide minute books for the secretaries of the different sections which he shall require to be properly attested by the secretaries thereof. He shall notify the officers and members of committees of their appointment and of their duties in connection therewith. He shall publish the official programme of each annual meeting. He shall perform such other duties as may be required of him by the President, the General Council or the Executive Committee. All his legitimate travelling expenses shall be paid for him out of the funds of The Association, and he shall receive for his services a salary to be determined by the Executive Committee.

CHAPTER VIII.—THE GENERAL COUNCIL

Section 1—Meetings of the General Council

The General Council shall meet for at least the first two days of the annual meeting of The Association, and thereafter, while The Association is in session, at the call of the Chairman. Before the close of the annual meeting it shall elect the officers and the Executive Committee and select the place for the next annual meeting, or, if thought advisable, for meetings up to three years in advance.

Section 2—Special Meetings of General Council

During the interval between annual meetings the General Council shall meet at the call of the Executive Committee. For all such meetings of the General Council due notice shall be sent to each member, stating the purpose of the meeting. The Executive Committee, if it so decide, instead of calling such meetings of the General Council may refer important questions to the General Council and obtain its decision by means of a mail ballot. In the event of a mail ballot being taken, two-thirds majority vote shall govern.

Section 3—Duties of the General Council

The General Council shall have supervision of all properties and of all financial affairs of The Association. It shall, through its officers, conduct all business and correspondence, and shall keep a record of all meetings and the receipt and expenditure of all funds, and shall report upon same in the *Journal* after the annual meeting.

Section 4—The Executive Committee may act for the General Council

In order that the business of The Association may be facilitated during the interval between meetings of the General Council the Executive Committee shall meet from time to time at the call of its Chairman, and shall have all the rights and powers of the General Council. It shall conduct all necessary business. In case of a vacancy in any office on account of death or otherwise it shall have power to appoint successors.

The President, the President-Elect, the Chairman of the General Council, the Honorary-Treasurer, the General Secretary, the Editor, and the Managing Editor shall be members *ex officio* of the Executive Committee, but only the elective officers shall have the right to vote.

CHAPTER IX.—COMMITTEES

Section 1—Duties and Powers of the Executive Committee

The Executive Committee shall hold one or more sessions before the close of the annual meeting at which it is elected. At its first meeting it shall elect its Chairman and appoint the Chairmen of the Standing Committees for the ensuing year. Between the meetings of the General Council, the Executive Committee shall represent the General Council in all its business affairs and shall exercise all the rights and powers of the General Council. The Executive Committee shall report to the General Council at the annual meeting and at such other times as the Chairman of the General Council may request.

The Executive Committee may meet when and where it may determine. On the request in writing of any three members (with voting power) of the Executive Committee, the Chairman shall call a special meeting. Five members (with voting power), exclusive of the Chairman, shall constitute a quorum for the transaction of business.

The Executive Committee shall be responsible for the appointment of the General Secretary, the Editor, the Managing Editor, the Associate Secretaries, and any other appointive officers, and shall fix their salaries.

The Executive Committee shall have charge of the publication of the official *Journal* of The Association and of all published proceedings, transactions, memoirs, essays, papers and programmes of The Association.

The Editor and Managing Editor shall present annual reports to the General Council and interim reports at each meeting of the Executive Committee. The Editor shall be reimbursed for legitimate travelling expenses incurred on Association business.

The Executive Committee may appoint Editorial Boards to assist the Editors.

The Executive Committee shall appoint the auditor and shall have the accounts of the Honorary Treasurer audited annually, or more often if desirable, and shall make an annual report on the same to the General Council.

Each member of the Executive Committee shall be reimbursed for legitimate travelling expenses incurred in attending meetings of the Executive Committee other than the first meeting or meetings of the New Executive Committee, which may be held before the close of the annual meeting.

Section 2—Committee on Legislation

Matters relating to medical legislation, Federal or Provincial, and matters requiring legislative action arising within The Association, may be referred by the Executive Committee to the Committee on Legislation for consideration and advice.

Section 3—Committee on Medical Education

To the Committee on Medical Education shall be referred all matters pertaining to medical colleges and medical education. It shall report upon the condition of medical education throughout Canada and upon any proposed change, and may suggest methods for the improvement of medical education.

Section 4—Post-Graduate Committee

To the Post-Graduate Committee may be delegated the responsibility of carrying out the post-graduate plans of The Association.

Section 5—Committee on Programme

This Committee, with the assistance of the Chairman and Secretary of each scientific section, shall have complete charge of the preparation of the scientific programme for the annual meeting.

Section 6—Committee on Constitution and By-Laws

To the Committee on Constitution and By-Laws shall be referred all matters relating to the subject before action thereon is taken by the General Council.

Section 7—Committee on Archives

The Committee on Archives shall be responsible for collecting as far as possible (*a*) the obituaries of members dying since the last annual meeting; (*b*) all documents and information relating to the various members and activities of The Canadian Medical Association which are deemed worthy of preservation. The Editor of the *Journal* shall be a member *ex officio* of this Committee.

Section 8—Committee on Public Health

It shall be the duty of this Committee to study and report upon all matters of Public Health which, in the opinion of the Committee, should engage the attention of The Association. To the Committee may be delegated such duties in relation to Public Health as in the opinion of General Council or Executive Committee should be undertaken by the Committee on behalf of The Association.

Section 9—Committee on Ethics and Credentials

To this Committee all matters of ethics and special questions of credentials shall be referred for consideration and report to the General Council or the Executive Committee.

Section 10—Committee on Economics

It shall be the duty of the Committee on Economics, excepting where otherwise provided, to deal with (*a*) social legislation which includes medical services or benefits presumably for medical services; (*b*) remuneration and employment of physicians by lay bodies, hospital or official bodies, including Federal, Provincial and Municipal Governments; (*c*) to report thereon with such recommendations as it may see fit to the General Council.

Section 11—Committee on Pharmacy

It shall be the duty of the Committee on Pharmacy to deal with (*a*) all matters arising out of the British Pharmacopœia or any Canadian Formulary or Pharmacopœia; (*b*) all matters arising out of the drug section of the Food and Drugs Act, the Narcotic Act, or the Patent and Proprietary Medicine Act; and (*c*) any inquiries from members of The Association relating to the use of standards of drugs.

Section 12—Hospital Service Committee

This Committee shall act in an advisory capacity to the Hospital Service Department of The Association.

Section 13—Committee on Cancer

To this Committee shall be referred all matters relating to the study and control of cancer.

Section 14—Special Committees

Each Special Committee shall assume, by direction, such duties as are allotted to it, and shall make progress reports to the Executive Committee at each of the meetings of that body or at any other time that such reports may be required by the President, the Chairman of the General Council, or the Executive Committee.

Section 15—Reports of Committees

Reports of all Committees shall be printed and mailed to all members of the General Council at least one week before the annual meeting.

Section 16—Limitations of Committees re Finances

No Committee shall expend any moneys or incur any indebtedness or obligation on behalf of The Association without the sanction of the General Council or the Executive Committee.

CHAPTER X.—ADDRESSES AND PAPERS

Section 1—Addresses at Annual Meeting

All addresses delivered at an annual meeting shall immediately become the property of The Association, to be published or not, in whole or in part, as deemed advisable, in *The Journal* of The Association.

Any other arrangements for their publication must have the consent of the author or of the reader of the same and of the Editor of the *Journal*.

Section 2—Publication of Papers Presented at Annual Meeting

All papers, essays, photographs, diagrams, etc. presented in any section shall become the property of The Association, to be published in the *Journal* of The Association or not, as determined by the Editor, and they shall not be otherwise published except with the consent of the author and of the Editor of the *Journal*.

Section 3—Disposition of Papers Presented at Annual Meeting

Each author of a paper read before any section shall, as soon as it has been read, hand it with any accompanying diagrams, photographs, etc., to the Secretary of the Section before which it has been presented. The Secretary shall endorse thereon the fact that it has been read in that Section, and shall then transmit it to the Editor of the *Journal*.

CHAPTER XI.—PROVISIONS FOR DISCIPLINE

Section 1—If any Member of The Association, after due inquiry by the Executive Committee shall be judged to have been guilty of disgraceful conduct in

any professional respect, he shall be liable to censure, suspension or expulsion from membership in the Association by resolution of the Executive Committee, confirmed by a three-fourths vote at the next annual meeting of General Council.

Section 2—Should any Member of The Association be convicted of any criminal offence, or have his name removed from the register of the Medical Council of Canada, or of the licensing body of any Province of Canada, because of felonious or criminal act, or disgraceful conduct in any professional respect, the Executive Committee, may, by resolution, confirmed at the next ensuing annual meeting of the General Council, by a three-fourths vote of those present, censure, or suspend or expel such person from membership in The Association.

Section 3—Any Member suspended or expelled by resolution as aforesaid shall thereby forfeit all his rights and privileges as a Member of The Association.

Section 4—Any Member suspended or expelled by resolution as aforesaid shall, subject to conditions imposed by the Executive Committee, be restored to membership upon resolution of the Executive Committee, confirmed at the next ensuing annual meeting of General Council.

Section 5—By subscribing to the application for membership under the terms of the By-Laws and Code of Ethics (See appendix) and becoming a Member of The Association, every Member attorns to these By-Laws, and agrees to such right of discipline as aforesaid, and thereby specifically waives any right or claim to damages in the event of his being so disciplined.

CHAPTER XII.—AMENDMENTS

1. Notice of Motion by one or more Members, to amend the By-Laws, must be placed in the hands of the General Secretary three months before the date of the annual meeting.

2. Amendments may be proposed by the General Council, the Executive Committee, or the Committee on Constitution and By-Laws without notice of motion, but the proposed amendments shall be published in *The Journal* in two issues preceding the annual meeting.

3. The By-Laws shall be amended by a two-thirds vote of the members of the General Council in session present and voting.

NOTE: Throughout these By-Laws, masculine designations are to be interpreted as including feminine.

At the meeting of the Executive Committee held in Toronto on April 15 and 16, 1938, the following resolution was adopted.

WHEREAS the Committee on Constitution and By-Laws has presented a revision of the Constitution and By-Laws applicable to Divisions; and Whereas amendments to the Constitution and By-Laws must be published twice in the *Journal* before being considered by the General Council in annual session; Be it resolved that the Executive Committee now authorize the present draft to be published in the *Journal*, in the issues of May and June, 1938; and further, that the Executive Committee now give Notice of Motion that, at the Annual Meeting in 1938, a resolution will be presented proposing that the Constitution and By-Laws for Divisions, as may be adopted, and the Constitution and By-Laws of the Association, as at present existing, be consolidated.

In Lighter Vein

ON A COUNTRY DOCTOR RETIRING

A gentleman of leisure!
No more a galley slave,
I'd spend a life of pleasure
Out on the wandering wave;
In silent shades I'd hide away
And rest in sweet repose,
I'd sleep all night and spend the day
In a nook which no one knows.

A gentleman of leisure!
Can I just make the grade;
I've stumbled into this old rut,
And in the rut I've stayed.
I've battled sickness all my life
Without a holiday;
Some Meds' can play the gentleman;
I've had to make the hay.

A gentleman of leisure!
I'd wear a stovepipe hat,
Make idleness a treasure,
And turn the calls down flat.
Not spend a life in revelry,
There's nothing there to gain,
Keep out of every deviltry,
And thus my health retain.

A gentleman of leisure!
I long for perfect rest,
I long for quiet pleasure,
Like a birdie in its nest,
I sometimes feel like Old Nick,
(Excuse satanic phrase),
And I punch my hypodermic
In the cuss who never pays.

A gentleman of leisure!
I'd have a happy time,
I'd sing to birds and butterflies,
And teach the birds my rhyme.
I'd wander o'er the hills by day,
Rest by the rippling rill,
Have one continuous holiday,
And go where e'er I will.

A gentleman of leisure!
Could I content myself
Not be a Julius Cæsar
But just a wandering elf
I'd sleep and have a pleasant dream
Out in the open wild,
Or watch the sparkling mountain stream,
Again a little child.

I cannot live in leisure,
I worry every minute,
I shake the dirty furnace,
And pile the coal within it.
By gosh what happy times I had
When I was a young laddie.
Just give me back those days, bedad,
But I'm an old granddaddy.

—*Dr. W. E. Gimby*

Hôpital de la Pitié, one week on Cardiology, under the direction of PROF. ANTONIN CLERC, 10 to 12 a.m., presentation of patients, radioscopy, electrocardiology, etc.

Hôtel-Dieu, one week on Ophthalmology, under the direction of PROF. TERRIEN; ophthalmological technique; clinical and laboratory examinations, every morning from 10 to 12 a.m.

Hôpital Broca, one week on Gynæcology, under the direction of PROF. MOCQUOT; clinical examinations, operations, dilatation of Fallopian tubes, etc., every morning from 10 to 12 a.m.

One week on Endocrinology, by PROF. CHARLES RICHET, in the afternoon.

Hôpital St-Louis, PROF. GOUGEROT, one week on Venereal Diseases.

One week on Pædiatrics in different children's hospitals, by PROFS. LEREBOULLET and DEBRE, also DR. ARMAND-DELILLE. In the forenoon, clinical examinations. In the afternoon, visits to nurseries, model dairies, etc.

One week on Neuro-Psychiatry in different hospitals, with the collaboration of PROFS. GUILLAIN, CLOVIS VINCENT and associates, PROFS. ALAJOUANINE, HAGUENEAU et DR. WORMS.

Hôpital St-Louis, one week on Dermatology, forenoon and afternoon, under the direction of PROF. GOUGEROT.

Institut du Cancer at Villejuif, PROF. VERNE, demonstrations and technique of normal Histology of tissue culture, in the forenoon from 9 to 11.

Faculty of Medicine, Laboratory of Physiology, PROF. BINET and DR. BARGETON; medico-surgical physiology, 14 to 15 hours; theoretical course, 15 to 17 hours; practical course.

Hôpital Cochin, morning and afternoon, under the direction of PROF. CHEVASSU; exploration of the urinary tract by uretero-retrograde pyelography and urethrography.

Hospice de la Salpétrière, every morning from 10 to 12, under the direction of PROF. GOSSET; abdominal surgery (stomach, intestine and biliary tract). In the afternoon, operations on the cadaver under the direction of DR. THALHEIMER.

The price of each of the above lectures is 300 francs for 6 mornings or six afternoons, and 500 francs for the lectures held in the morning and in the afternoon.

For full particulars and inscription write to the Office of l'Association pour le Développement des Relations Médicales entre la France et les Pays Amis (A.D.R.M.) Salle Béclard, Faculté de Médecine, 12, Rue de l'Ecole de Médecine, Paris VIe, France.

Vancouver Medical Association, Vancouver, B.C., Summer School Clinics, June 21st to 24th inclusive, 1938. Secretary, Dr. Frank Turnbull, 203 Medical Dental Building, Vancouver, B.C.

The Opening of a Summer School at Mt. Sinai Sanatorium, Prefontaine

(Near Ste. Agathe, Que.)

A refresher course for post-graduates in tuberculosis in all its aspects. A course of lectures, ward-rounds, x-ray and pathological conferences have been arranged. A number of eminent authorities in this field have been secured. In addition to lectures each student will be allotted a case daily for examination and history-taking. All cases with the findings of the students will be discussed at ward-rounds and round-table conferences. Students will have daily tuition in the laboratories. Laboratory courses will be given in the newer methods of diagnosis.

It is felt that this course will appeal to general practitioners, house-officers and medical students. A registration fee of $5.00 for practising doctors will be required. There will be no registration fee for house-officers and medical students.

For further information address Dr. A. M. Vineberg, 1414 Drummond Street, Montreal.

PROGRAM

Thursday, July 14th

Morning—Registration.

Afternoon—Allotment of cases and ward-rounds.

Friday, July 15th

9.00 a.m.—

History and physical signs of pulmonary tuberculosis.—Dr. D. Mendel, Montreal.

Ward-work.

Ward-rounds.—Conducted by Dr. E. Mayer, New York.

1.30 p.m.—

Epidemiology of tuberculosis.—Dr. E. R. Foley, Quebec.

X-ray lecture and demonstration.—Dr. C. Liebman, Montreal.

Ward-work.

Laboratory methods—

Sputum examination. Urine and exudates.—Dr. Lewin.

Sedimentation rates. Gastric lavage. Differential blood counts.—Dr. Gottlieb.

O.T. tests. Culture of Tb. bacillus. Guinea-pig inoculation.—Mr. A. Guernon.

The public health problem in tuberculosis.—Dr. G. Fleming, Montreal.

Saturday, July 16th

9.30 a.m.—

Diagnosis, classification and prognosis of pulmonary tuberculosis.—Dr. Phelps, Laurentian Sanatorium.

Saturday, July 16th—*Continued*

Correlation of pathology and x-ray.—Round table conference.

Ward-rounds.

1.30 p.m.—

Treatment of pulmonary tuberculosis.—Dr. E. Mayer, New York.

Surgical collapse therapy.—Dr. E. Archibald, Montreal.

Ward-work.

Pathology of tuberculosis with demonstration.—Dr. Simon, Montreal.

To be followed by entertainment.

Sunday, July 17th

9.30 a.m.—

Modern collapse therapy in general.—Dr. E. Mayer, New York.

Demonstration of pneumo- and oleo-thorax.—Drs. D. Mendel and H. C. Ballon.

X-ray and clinical conference.

Monday, July 18th

9.00 a.m.—

Extra-pleural pneumothorax.—Dr. A. M. Vineberg, Montreal.

Ward-work.

Physiology of the thorax.—Dr. H. C. Ballon, Montreal.

2.00 p.m.—

The differential diagnosis of pulmonary tuberculosis.—Dr. E. Mayer, New York.

Laboratory methods—

Sputum examination. Urine and exudates.—Dr. Lewin.

Sedimentation rates. Gastric lavage. Differential blood counts.—Dr. L. Lowenstein.

O.T. tests. Culture of Tb. bacillus. Guinea-pig inoculation.—Mr. A. Guernon.

Tuesday, July 19th

9.00 a.m.—

Tuberculosis in Childhood.—Dr. M. Scherzer, Montreal.

Ward-work.

Ward-rounds.

X-ray conference.

2.00 p.m.—

Surgical tuberculosis in children.—Dr. M. Kaufmann, Montreal.

Diseases commonly associated with tuberculosis.—Dr. S. Ortenberg, Montreal.

Ward-work.

Wednesday, July 20th

9.30 a.m.—

Tuberculosis of the eye, with demonstration.—Dr. Rosenbaum, Montreal.

Tuberculosis of the ear, nose and throat.—Dr. A. O. Freedman, Montreal.

Wednesday, July 20th—*Continued*

2.00 p.m.—

Tuberculosis and pregnancy.—Dr. G. Phillips, Montreal.

Renal tuberculosis.—Dr. M. Ratner, Montreal.

Round-table conferences will be held on the following subjects during lunch periods: Treatment of pulmonary hæmorrhage; treatment of spontaneous pneumothorax; management of intestinal tuberculosis; contact with tuberculosis; skin tuberculosis.—Dr. B. Usher, Montreal.

Letters, Notes and Queries

Silk Technique

To the Editor:

In reading the interesting paper "Silk technique: its rôle in wound healing" by Doctors Gavin Miller and J. C. Luke which appeared on page 358 in the April issue of the *Canadian Medical Association Journal*, I was quite surprised to find that these authors interpreted my research results as having "shown that all brands of catgut tested, both domestic and foreign, were never uniformly sterile".

In justice to certain American suture manufacturers whose products I tested over a period of five consecutive years, and as clearly indicated in Table II in my paper to which Doctors Miller and Luke refer in their bibliography, six brands of catgut sutures were uniformly sterile throughout the period of investigation. Incidentally, subsequent tests of those same brands made over an additional three-year period have corroborated my previous results. Therefore, these six brands have been found uniformly sterile throughout a period of eight consecutive years.

In the next sentence of the same paragraph of their paper, these authors say: "He states that so-called sterilization by any method yet devised is inefficient and unreliable." This sentence, of course, is contrary to the facts. Inadvertently, perhaps, the word "chemical" was omitted by Doctors Miller and Luke from this sentence, for in my published paper I stated: "The so-called chemical sterilization of surgical catgut by any method yet devised is inefficient and unreliable." The purpose of publishing the results of my bacteriologic researches was not to condemn catgut as a suture material, but rather to point out the fallacy of chemical sterilization which had been demonstrated repeatedly during my studies of catgut sterility to be inefficient and unreliable.

It is unfortunate that my results were not correctly interpreted and reported in the paper

Answers to letters appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

by Doctors Miller and Luke, because surgeons who read it may derive an erroneous impression of my work.

This matter is brought to your attention in the hope that the publication of this letter in your "Letters, Notes and Queries" column will serve to correct, in a measure, the misinterpreted and misquoted findings of my bacteriologic researches.

RALPH O. CLOCK, M.D., F.A.C.P.

New York,
April 26, 1938.

To the above Dr. Miller replies as follows.

I wish to thank Doctor Clock for correcting the inaccuracy in the quotation from his article. The word "chemical" was present in my original note, and was evidently left out by mistake.

A review of his article shows that six of the manufacturers uniformly produced sterile catgut, the rest being for the most part unsterile. The percentages were smaller for those in the case of foreign brands. The important thing seemed to me that Clock emphasized very strongly the difficulty of the user being sure of the sterility of any catgut, especially as he naturally did not name the manufacturers whose catgut was uniformly sterile.

I should like to add that the responsibility for this was mine and not that of my collaborator.

GAVIN MILLER.

Montreal,
May 5, 1938.

Panel Practice in Great Britain

To the Editor:

I practised in a thickly settled industrial area in London, England, under the panel system, for about two years. This was about ten years ago, but conditions are in no way different at the present time.

Practices in these parts are practically always bought and sold, and their value can usually be determined by the number of patients which a doctor has on his panel. The income is usually extraordinarily stable from year to year. The total income might be twice the amount which the panel practice would bring in. In a poor class district it would probably be less, but in a better class district, by reason of there being a larger number of non-panel patients, the total income would most likely be more than twice that of the panel income. However, in the latter case, while the scope for increase would be greater, the income would not be so stable. In order for a patient to go on the panel, he must have a certain maximum income, and he must have an employer. The nature of a patient's occupation has no bearing on the matter. Hence, women and children cannot go on the panel unless they are in employment. This does not cover maternity cases, but there is another allowance for these cases, the amount being £2/2 for multiparæ and £3/3 for primiparæ.

The capitation fee for panel patients is about ten shillings per year. For this fee ordinary medical work is done, but no surgery, except such things as suturing wounds, opening abscesses, etc. Such operations as tonsillectomy are not done. The doctor, however, gives first-aid treatment in all cases.

Each time a panel patient comes into a doctor's "surgery", a record must be made of his attendance on a special card, one of which is kept for each individual patient. If he is not able to work a certificate is given to him to that effect, and this must be repeated about every week. When he is fit for work another certificate is given. If a doctor has more than 2,500 panel patients he must employ an assistant. A patient may change his doctor by giving so many weeks' notice.

There is a fee for mileage in country districts, but there is none in the cities. Doctors prescribe for their panel patients, and these prescriptions are filled in the "chemist shops". Most of this prescribing is done from a special pharmacopœia which is issued for that purpose. The mixtures are good but inexpensive, and are supposed to cover the needs of most patients. However, any ordinary drug may be added, and a doctor's prescribing is not confined to this pharmacopœia, except that a doctor will often get into trouble if he prescribes a lot of expensive proprietary mixtures. In the country a special fee is given to doctors for the supply of medicines.

Most doctors make up their own medicine for private patients. The fee for a consultation and a bottle of medicine might be about 2 shillings and 6 pence, or even less. Patients keep coming back to see a doctor very frequently, sometimes every couple of days, for such a condition as bronchitis. Patients in these parts visit a doctor much oftener for the same condition than they do here. The fees, however, are much lower.

Practically all surgery is done in the charity hospitals. The surgeons receive no remuneration, but they hold an honorary position on the hospital staff, and this position gives them a prestige and connection which enables them to work up a private clientele. The hospitals are closed to all doctors except those on the staff, and a general practitioner seldom visits his patients once they have gone to the hospital. Well-to-do patients usually have their operations done in "nursing homes". These are very expensive, but are seldom so well equipped as the hospitals.

The Insurance Scheme in England is actually administered by the so-called "Friendly Societies". These societies existed before the advent of the panel, and large numbers of poor people

paid small sums into them weekly in return for free medical service. A doctor may still have a number of patients on these "clubs" who cannot go on the panel.

These "Friendly Societies" are supervised by the government under the panel system, and there is a Board consisting of representatives of the Friendly Societies, the medical men and the government. A so-called "Regional Medical Officer", who is a doctor, visits all panel doctors periodically, and checks up on such things as records of patients' attendance, the cost of drugs supplied, etc.

There is sometimes some conflict between the medical men and the Friendly Societies, and in that case the government representatives act as arbiters. Naturally, the cheaper the doctors' work, and the less the patients' medicine costs, the better it is for the societies. However, the medical men in England are well organized and have very able representatives. In any dispute they have usually handled their case with dignity and great efficiency, and have usually won their point. On the other hand the Friendly Societies have usually been fair and have argued the dispute from the standpoint of the good of the patients.

It would be well for those who are advocating state medicine in Canada to study thoroughly the system in England. In England too much of a doctor's time is taken up in looking after records. He has two parties to please, one is his patients, and the other is the Regional Medical Officer and the Panel Committee. The latter might be less concerned as to whether a doctor was a good medical man than they would be as to whether his records were satisfactory. The best doctor to them might be one who would give them least trouble. He must visit patients when he is asked, as they do not like complaints, keep the cost of drugs as low as possible, and he must keep his records neat and absolutely up to date. If he does these things he is the best doctor possible from their standpoint. Nevertheless, the best doctor from a patient's standpoint is a very different thing. In practice, however, the system has worked out very well because all parties have been fair and have tried to make it a success. However, in a newer country like Canada, where the people are less disciplined and less homogeneous, such a system might not work so well, more especially because the English system was chiefly designed to take care of the employee class whose income can readily be ascertained and where the population is more concentrated.

GEORGE B. FERGUSON.

Wadena, Sask.
April 5, 1938.

Proctology

To the Editor:

Of late proctology, or disease of the colon, rectum and anus, has been receiving well-merited attention not only from English and American universities but from those bodies of specialists constituted to license specialties. Many universities today have departments on this specialty under a professor and staff, but Canada lags behind. The American Proctologic Society consists of about 250 Associates and Fellows, 80 per cent of whose work must have to do with proctology, and requires an exhaustive examination before membership in the Society may be obtained, and membership in this Society is coveted just as much as in the urological, gastro-intestinal, pædiatric and others.

Ignorance of methods of diagnosis and treatment is surprising even among recent medical graduates. These come to our hospitals as interns with only a meagre idea of even the anatomy of the rectum and anus.

Perhaps in no other region of the body does one find more opportunities for practical diagnosis, than in the case of the rectum, and in no other areas are more careless examinations made and gun-shot treatment instituted to cure a case of piles where even a digital examination a few months before would have demonstrated an early cancer which now has become inoperable.

Proctology should be recognized as a specialty as much as any other and certainly should be taught more thoroughly in our medical schools and by *competent* teachers.

F. B. BOWMAN.

Hamilton,
April 4, 1938.

Fur Dermatitis

To the Editor:

Can you tell me how to investigate a case of dermatitis on the face caused by a fur collar? The cutaneous test with protein extract shows some reaction to Chinese dog,—but the actual irritant may be in the dye. There does not seem to be any way of finding out what dyes are used in these furs.

HENRY MOYSE, M.D.

Bedeque, P.E.I.,
April 20, 1938.

Answer:

In answer to Dr. Moyse's request, actually there are different dyes used in the dyeing of furs. The most common one in use is paraphenylendiamine.

The test which is of the most value is a patch test, using the actual fur from the collar worn by the patient. A small clipping from the fur is moistened with water, placed on the skin over

an area of ¼ inch square, and covered by a piece of Elastoplast (adhesive plaster is apt to give rise to reactions in most persons) 2 inches square, in the centre of which has been attached a piece of cellophane 1 inch square. This patch may be left on for from 24 to 48 hours, then removed, and a positive reaction is characterized by redness, with numerous small vesicles, or sometimes a raised, erythematous plaque with some exudation. The test is usually tried on the back, at some distance from the fur dermatitis.

It might be mentioned that the reaction may be negative in some individuals, and in that case the best test is the removal of the fur collar from contact and then, following the total disappearance of the eruption, the fur collar should be worn again. If the skin flares up, it may then be concluded that the dermatitis is due to the collar in question.

J. FREDERICK BURGESS.

Montreal,
April 27, 1938.

Medico-Legal

Recent Medical Legislation in Ontario

At the Session of the Legislature of the Province of Ontario, which prorogued early in April, several measures of medical interest were considered. The following summary outlines the more important Bills.

GOVERNMENT BILLS

Pasteurization of Milk Act.—A Bill to enforce pasteurization of milk offered for sale. The Act leaves with the Minister of Health discretionary power as to when the provisions shall be enforced in any area. Medical testimony in favour of the Bill was heard by the Committee on Agriculture.

Control of cancer remedies.—Following representations made by the medical profession a government bill was passed to set up a commission with power to investigate and control the many alleged "cures" for cancer. The Commission is empowered to demand disclosure of the formula and other details of the remedy under consideration.

An Act to Amend the Sanitaria for Consumptives Act relieves the municipalities from the payment of charges for treatment of patients in sanitaria for consumptives and provides for the payment of all such charges by the Province.

An Act to Amend the Public Health Act provides for the making of regulations by the Minister respecting the instruction and qualification of medical officers of health, sanitary inspectors, and public health nurses. The appointment of medical officers of health is made subject to the approval of the Minister; an upper age-limit of 70 years is provided for these officers. The Minister may regulate the construction, repair, etc., of mattresses and other stuffed and upholstered articles. Carriers of communicable disease are made controllable by the M.O.H.

The Private Hospitals Act is amended to prohibit the unauthorized use of the term "hospital".

The Private Sanitaria Act is amended to provide for the appointment of a commissioner or commissioners to inquire into the administration of the Act as it relates to sanitaria operating under its provisions.

The Mental Hospitals Act is amended to provide for the return of patients released on probation and for the admission of epileptics to any mental hospital.

The Nurses' Registration Act is amended to prohibit the establishment of training schools for nurses without the approval of the Minister of Health.

The Burial of War Veterans Act is amended to provide for the burial of indigent veterans of any branch of the services of all wars.

PRIVATE BILLS

1. A Private Bill submitted on behalf of Miss Renée Caisse, of Bracebridge, to permit her to practise medicine in the field of cancer, was rejected. The provisions of the Government legislation noted above were felt to cover this type of case and it would have been illogical to make an exception in this instance.

2. A Private Bill to authorize Dr. J. E. Hett to practise medicine, surgery, and midwifery, was withdrawn when the College of Physicians and Surgeons of Ontario agreed to restore his name to the Register. The disclosure of the formula and nature of the treatment was the point at issue and the government measure already referred to requires the revelation of these details.

3. A Private Bill to amend the Medical Act, submitted on behalf of the Osteopaths, Chiropractors, and Drugless Therapists, was rejected by the Private Bills Committee. The proposed amendment would have permitted these three classes of persons, registered under the Drugless Practitioners' Act, to assume the title "Doctor" as an occupational designation. The campaign in opposition to this Bill was conducted by the Joint Advisory Committee representing the College of Physicians and Surgeons, the three medical faculties of the Universities of Ontario, and the Ontario Medical Association. The sole argument used before the Private Bills Committee was that the public deserves the protection of the ability to distinguish between a legally qualified medical practitioner and an adherent of the manipulative cults, by restricting the use of the title "Doctor" to the former.

Abstracts from Current Literature

Medicine

Marihuana: Our new addiction. Yawger, N. S.: *Am. J. M. Sc.*, 1938, 195: 351.

The author reviews the facts concerning marihuana and discusses the effects of addiction to it. The name "marihuana" is derived from a Mexican word meaning "pleasant feeling". The drug is known to the pharmacologist as *Cannabis sativa*, to history as "hashish", and to the addict, when in the form of a cigarette, as a "reefer". The plant from which it is derived is widely distributed throughout the United States, and was even found growing wild within the walls of the Colorado State Reformatory. The plant has numerous valuable commercial uses. Its fibre is made into twine, rope, and bags. It yields a rapidly drying oil useful as an ingredient of paints and varnishes and in the manufacture of soaps and linoleum. Therapeutically, marihuana has been employed for the relief of pain, in migraine, to overcome nervousness, and to produce euphoria.

The marihuana habit is almost as old as history. It was prevalent in Persia and China long before the Christian era. The popularity of "gaiety pills" made from hemp and sugar is recorded in Sanscrit. Currently, its use is confined largely to cigarettes, which are inhaled deeply. Two or three of these have the desired effect, which is as follows. The first noticeable effect is a lessening of the subject's power fully to control his thoughts and actions. In addition to a feeling of exhaltation and euphoria the smoker is aware of increased power and energy. Inhibitions are much reduced causing dominant emotions to become magnified. Thus the genial man grows more fond of his fellows, the quarrelsome one pugnacious, the timid one more fearful, and the criminal more emboldened. Perception is disturbed in the matter of time and space. Sensations of pain and touch are diminished, and the pulse rate is increased. With the full return to consciousness no subsequent ill effects are experienced. The craving that accompanies alcohol and morphine addiction is not present, so indulgence can be easily discontinued. There have been no known fatalities. The remote effects of the drug upon the personality have been summed up by Bromberg, who found that the anti-social, aggressive and sadistic elements of the personality uncovered by the drug are responsible for any crime, rather than any specific crime-producing properties of the drug. He adds that alcohol is more responsible as an agent in crime than marihuana. When used daily in large quantities the direct action upon the cerebrum often causes chronic mental deterioration. In the United States the drug has been given a separate listing among narcotic drugs. All states except North Carolina and Tennessee have enacted legislation against its distribution. E. S. MILLS

An Evaluation of the Congo-Red test for Amyloidosis: A Correlation of the Autopsy Findings and Dye Absorption in 125 cases. *Lipstein, S.: Am. J. M. Sc.*, 1938, 195: 205.

Lipstein has studied the tissues obtained at autopsy from 125 cases of pulmonary tuberculosis in an attempt to evaluate the Congo-red test as an indication of amyloidosis. The patient's ages ranged from 2 to 72 years. All had received the Congo-red test prior to death. Amyloidosis was present in 34 of the 125 cases. In the presence of amyloidosis the percentage of Congo-red absorption ranged between 90 to 100 per cent, with 70 per cent showing complete absorption of the dye. In the absence of amyloidosis, the percentage of dye absorption ranged between 10 and 75 per cent in all instances, with the exception of four in which values of 80, 90, 95 and 100 per cent were recorded. The author's conclusion is that the Congo-red test is positive for amyloidosis only when the percentage of dye absorption is 90 per cent or higher. The presence of amyloidosis in the kidneys alone was sufficient to produce a one hundred per cent absorption of the dye. It was of further interest that a comparison of the type and duration of the disease present failed to reveal any factors which might account for the presence of amyloidoses in 34 cases and its absence in the remaining 91 cases. E. S. MILLS

Surgery

Hygroma Colli Cysticum and Hygroma Axillare. *Goetsch, E.: Arch. Surg., 1938, 36: 394.*

The term hygroma should be limited to multilocular cystic tumours of benign neoplastic nature which have a lymphatic origin and whose cavities are lined with true endothelium. These tumours originate, for the most part, in the neck and axilla. Occasionally they occur in the groin or in the retroperitoneal space. The manner of growth and propagation of hygroma, its potentiality of increasing in size to an almost unlimited extent, and its tendency to penetrate and destroy anatomical structures, have heretofore been little understood. It is a benign, true neoplastic tumour. Goetsch reports in detail with critical clinical analyses the records of 12 patients with hygroma. In ten instances the growth involved primarily the cervical region and in two the axilla.

Clinically, there are no local or constitutional symptoms although there may be cosmetic disfigurement. Symptoms may develop, however, in cases of advanced uncomplicated involvement as a result of pressure on important structures, such as the trachea, pharynx and nerve plexuses. There may be severe respiratory embarrassment when the tumour extends to the mediastinum.

The large hygroma has a tendency to become secondarily infected, and the infection may be followed by serious symptoms and even death. Early treatment is advisable and radical surgical excision is by all odds the treatment of choice. G. E. LEARMONTH

Pilonidal Cysts. Zieman, S. A.: *Surg., Gyn. & Obst.*, 1938, 66: 231.

The author reports one of the cases which he found to be of the type arising from an *Anlage* of the neural canal. It presented several sinuses, one of which led into the sacrococcygeal articulation, and the lining of which was continuous with the spinal cord coverings. (Note; he does not state the cavity was continuous with the subarachnoid space.)

He gives 4 theories of origin of pilonidal cysts. These are, (1) ectodermal invagination with arborization: (2) imperfect union of the two halves of the body; (3) overgrowth of the mesoblastic tissue lying between the skin and bone; (4) the one under discussion. Those of neural canal origin may show as a simple cyst, a cyst closed at one end, a cyst open at both ends or communicating with the spinal cord. He injects methylene-blue-hydrogen-peroxide solution in the sinus before operation, prefering this to aqueous or ethereal solutions. Block dissections are carried out with iodoform pack for 24 hours. This is then replaced by vaseline gauze and mercurochrome and dressed biweekly. Most of his patients return to work in one week although treatments are continued from 8 to 12 weeks.

FRANK DORRANCE

The Relation of Chronic Cystic Mastitis to Carcinoma of the Breast. Lewis, D. and Geschickter, C. F.: *Surg., Gyn. & Obst.*, 1938, 66: 300.

The author delves into the literature on chronic cystic mastitis and cites several well-known surgeons of the past generation to substantiate the claim that chronic cystic mastitis and early adenosis—Schimmelbusch's disease—are not precancerous lesions. One series of 515 cases of cystic mastitis had a follow-up on 250 of them with an incidence of carcinoma of 0.4 per cent during the 5-year period: 76 in another series have been followed for 10 or more years with an incidence of breast carcinoma in 2 only. Ninety-seven cases of advanced adenosis have been followed for 5 years with an incidence of 1 per cent. The author seems to be in favour of treatment by the use of anterior pituitary-like substance, œstrin and trial of pregnancy. He finds as great an incidence of cystic disease in nulliparous as in parous women. Carcinomas numbering 2,675 have been examined, with 29 cases of adenosis present; 3 cases of cystic disease. Less than 0.5 per cent of Schimmelbusch's disease are found in the ordinary type of carcinoma of the breast, but 30 per cent of the comedo type show a relationship, histologically, to Schimmelbusch's disease.

Abstractor's note.—No mention is made of the sterols in the internal secretory injections and their effects on the production of carcinomas, as has been recently reported.

FRANK DORRANCE

Obstetrics and Gynæcology

Prophylactic Use of Sulphonamide Preparations in Obstetric Practice. Johnstone, R. W.: *Brit. M. J.*, 1938, 1: 562.

Prontosil album (p-aminophenylsulphonamide) in 5 grain tablets, or proseptasine (p-benzylaminophenyl-sulphonamide), in 7½ grain tablets, were administered to every patient at the Royal Maternity and Simpson Memorial Hospital, Edinburgh, in the early days of her puerperium. This clinical experiment extended over the whole period of one year (1937). The prontosil group received in general a total of 165 grains of prontosil album in the course of seven days, while the proseptasine group received 247½ grains of proseptasine in the same period. Where there was a clear probability of uterine infection, *e.g.*, in "failed forceps" outside hospital, acute pyrexia early in the puerperium, or cases of septic abortion, the soluble form of sulphonamide was injected intramuscularly in addition to the oral administration. There were remarkably few cases in which toxic effects of the drugs were observed. The most frequent toxic sign was cyanosis; the only other sign noticed at all frequently was a slight drowsiness. Magnesium sulphate was not given by mouth at the same time as any sulphonamide preparation.

Comparison of results in 1937 with those in 1934 and 1935 when no drugs were used as a prophylactic measure showed a reduction in local uterine infection from 8.2 per cent in 1934 and 9.5 per cent in 1935 to 6.2 per cent in 1937. The incidence of morbid puerperia, British Medical Association standard, in 1934 was 3.8 per cent; in 1935, 3.6 per cent; in 1937, 1.9 per cent. ROSS MITCHELL

An Exact Method of Determining Ovulation and Pregnancy. Samuels, J.: *Brit. J. Obst. & Gyn.*, 1937, 44: 1036.

The author has ingeniously devised and described a new method of determining ovulation by means of a cycloscope, a spectroscopic examination of the tissues. One of the interdigital webs between the thumb and index finger is used. A darkened room with artificial light brings out the hæmoglobin spectrum more clearly. By means of reduction-time readings of oxyhæmoglobin variations in hormone secretion levels ovulation and pregnancy changes are detected. The author has proved his readings by following with laparotomies and macroscopically examining the ovaries. He states that

declines shown most visibly on the ninth, tenth, twelfth, and eighteenth day of the cycle are due to two or more ovulations respectively during one cycle. The ova develop and ripen according to certain laws and the Graeffian follicles burst independantly. The occurrence of binovular twins, superfetation, and superfecundation proves that more than one ovum is released during a cycle. If the author's investigations are reliable the whole theory of sterility is altered, because if more than one ovum is released during the cycle there is no definite sterile period as now taught. P. J. KEARNS

Menstruation-like Hæmorrhage in Rabbits Induced by Gonatropic Hormone. Zondek, B.: *J. Obst. & Gyn. Brit. Emp.*, 1938, **45**: 1.

Menstruation in rabbits produced by gonadotropic hormone has been investigated by the author. He refers to his article in 1935 on normal menstruation in women and the influence of follicular hormones upon it. The follicular hormone possibly influences primarily through inhibition of the development of the corpus luteum and in the production of progesterone, or, secondly, by the follicular hormone primarily inhibiting the gonadotropic function of the anterior pituitary, that is, the effect of prolan B. The author supports the latter view. The follicular hormone influences the secretion of gonadotropic hormone but does not influence its production, as is shown in eunuchoid dwarf rats. The onset of menstruation can be postponed by follicular hormone. The author has elaborated, through the use of hormones, uterine mucosal bleeding in rabbits. He classifies spurious pseudo-menstruation, real pseudo-menstruation, spurious menstruation, and real menstruation. In his summary the author states that the use of gonadotropic hormones produces within the proliferative uterine mucosa of the rabbit flat hæmorrhages, uprooting of the mucous membranes, with penetration of blood into the uterine cavity. The bleeding is caused by the gonadotropic hormone derived from pregnancy urine (prolan) as well as by gonadotropic hormones derived from the blood of pregnant mares (prosylan). Bleeding occurs only after intrávenous injections and only in the proliferative, never in progestational, mucosa. The corpus luteum hormones suppresses the bleeding. The gonadotropic hormone mobilizes a bleeding substance in the ovary, as it does not act in contrasted animals. This leads us to a third unclassified hormone which is produced in the ovary. The five-day treatment of one hundred R.U. gonadotropic hormone given intravenously works best for this experiment.
P. J. KEARNS

Wheat Germ Oil Therapy. Shute, E,: *Am. J. Obst. & Gyn.*, 1938, **35**: 609.

Wheat germ oil should be kept cold to prevent deterioration. In bulk or in capsules it retains reliable potency very little longer than eight weeks, even when so kept. The administration of wheat germ oil up to term does not delay the onset of labour nor prolong the duration of labour. Green foods, such as lettuce or water cress, do not replace wheat germ oil in the treatment of the pregnancy complications related to deficiency of vitamin E in the human being. Milk may be an important factor in the diet as concerns its content of vitamin E.

Human males show a seasonal variation in the œstrogenic substance in their blood and hence in their assimilated vitamin E. This may have some bearing on male sterility. ROSS MITCHELL

Urology

Malignant Tumours of the Kidney in Children. Kretschemer, H. L.: *J. Urol.*, 1938, **39**: 250.

Among the malignant tumours of the kidney the so-called adenomyosarcoma or mixed tumour of Wilms occupies a very interesting and unique position. This type of tumour has certain characteristics which the ordinary renal tumour does not possess and these may be stated as follows: (1) although a few cases have been reported in adults, the fact remains that this is essentially a disease of infancy and childhood; (2) as a rule it runs a silent and rapid course, as evidenced by the fact that these tumours reach a large size before medical aid is sought; (3) the singularly characteristic and unique histological picture; (4) its generally fatal outcome; (5) the multiplicity of theories advanced from time to time regarding its pathogenesis.

As a rule the symptoms of this group of tumours are general rather than urological, and more frequently the doctor is consulted because of enlargement of the abdomen or because the child is anæmic, due to loss of appetite, etc. Occasionally the patient may complain of pain in the affected side or of a sensation of weight. Hæmaturia occurs in about 15 per cent of cases, but as a rule the urine is negative. The diagnosis is established almost entirely by pyelography. The treatment advised is pre-operative irradiation, nephrectomy, and post-operative irradiation. Even where extensive irradiation has been employed the results are not on the whole satisfactory, and the mortality rate is exceedingly high. J. V. BERRY

The Local Use of Arsphenamines in Acute Gonorrhœal Urethritis. Heslin, J. E. and Milner, W. A.: *J. Urol.*, 1938, **39**: 77.

The authors, experimenting with the use of arsphenamines locally in acute gonorrhœal urethritis, claim to have discovered a new and effective cure. In a large series of cases treated the symptoms were milder, the duration of discharge lessened, and the incidence of complications was reduced. They also noted that in non-specific urethritis the action of the drug

was most active. Sulpharsenamine, 1 decigram to 1 dram of distilled water, is the solution recommended. J. V. BERRY

Therapeutics

Bone Marrow Concentrate in the Treatment of Agranulocytosis. Markberg, C. M. and Wiles, H. D.: *Arch. Int. Med.*, 1938, **61**: 408.

Preparations of bone marrow have been found useful in this condition, but being very unpalatable are extremely difficult to administer. The authors by removing the free fat present and dissolving the residue in a bland oil, such as peanut or cottonseed, produced a concentrate with each drop the equivalent of a gram of strained yellow bone marrow, taken from tibias and femurs of cattle. Ten patients were treated with concentrate prepared by the authors or Armour and Company, with the same technique — the diagnosis (1) arthritis with leucopenia; (2) agranulocytic angina in 4; (3) leucopenia in 2; (4) agranulocytosis with peritonsillar abscess; (5) agranulocytosis; (6) leucopenia with tonsillar ulceration, in one each. Several of these patients had been taking aminopyrine, which may have had a part in the etiology. Several were treated with pentnucleotide, but did not hold their improvement or recover until given the bone marrow concentrate, which usually took effect in less than forty-eight hours, as shown by a marked increase in the white cell count and the percentage of polymorphonuclear cells, and sustained clinical improvement. P. M. MACDONNELL

Peritoneal Lavage in the Treatment of Uræmia. An Experimental and Clinical Study. Wear, J. B., Sisk, I. and Trinkle, A. J.: *J. Urol.*, 1938, **39**: 53.

The authors, cognizant of the incomplete knowledge as to the toxic properties of uræmic blood, suggest that if this toxicity could be removed for a short period of time renal function may make remarkable recovery under certain conditions. The most toxic element has not been identified, but it would seem to belong to the amino-acid group and probably adds to the damage already present in a diseased kidney. Previous investigation tends to show that this toxic substance in uræmic blood is dialysable and has nitrogen in its composition. There is little hope that peritoneal lavage will restore hopelessly damaged kidneys, but it was demonstrated clinically that in those cases where there is hope of return of kidney function the method is well worthy of trial. The procedure is without morbidity or mortality, and special precautions must be taken to combat the marked fall in the CO_2 combining power of the blood. J. V. BERRY

Pathology and Experimental Medicine

The Cause of Death in Coronary Thrombosis, with Special Reference to Pulmonary Embolism. Eppinger, E. C. and Kennedy, J. A.: *Am. J. M. Sc.*, 1938, **195**: 104.

The authors have reviewed the records of 200 cases of coronary thrombosis autopsied at the Peter Bent Brigham Hospital between the years 1913 and 1936, with special reference to the cause of death. Sixty-four of the patients died suddenly; 107 died from congestive heart failure; and 29 from miscellaneous causes, chiefly irrelevant in type. An analysis of the cases in which sudden death occurred showed that 34 were due to possible ventricular fibrillation, 15 to myocardial rupture, 13 to pulmonary embolism, and 2 to Stokes-Adams syndrome.

In the large group who died directly or indirectly as a result of congestive heart failure, bronchopneumonia was the most frequent contributory cause; next in frequency of occurrence was pulmonary embolism, which occurred in 35, or 32.7 per cent, of the cases with congestive heart failure. In many of these the clinical signs and symptoms immediately preceding death were such as to suggest embolism. Others showed such a rapidly changing clinical picture that pulmonary embolism was not suspected. The source of the pulmonary emboli was the interventricular septum in 17 cases, the right auricle or right auricular appendage in 18, and the pelvic or leg vein in eight. Systemic emboli occurred in 23 cases in the entire group, and these had their origin from the endocardial surface of the left ventricle in 20 cases and from that of the left auricle in three. Two patients died from mesenteric embolism and one from cerebral embolism. The authors believe that embolism in coronary thrombosis is a more frequent direct or contributory cause of death in this disease than is generally believed. E. S. MILLS

Anæsthetics

Postanæsthetic Encephalopathy following Cyclopropane. Gebauer, P. W. and Coleman, F. P.: *Ann. Surg.*, 1938, **107**: 481.

The authors report a case in which death followed the administration of cyclopropane and oxygen by the carbon dioxide absorption technique over a period of 2 hours and 35 minutes. The operation was a right-sided, first-stage thoracoplasty with removal of the upper three ribs together with a cervical rib, in a young white female, aged 29. Premedication consisted of sodium amytal, gr. iii, two hours previously, morphine sulphate gr. ¼, and atropine sulphate gr. 1/150. The blood pressure before the induction was 110/70; pulse 80; and respirations 20.

Throughout the operation the patient's colour was pink, the skin warm, the respirations 24,

and the pulse varied between 70 and 80 until the completion, when it rose rapidly to 145. After induction the blood pressure rose to 120/80 and remained there until the pulse rate started to increase, when it dropped to 90/60. The condition at the close of the operation was reported as "good". At this time a venoclysis of 5 per cent glucose in distilled water was commenced.

Shortly after her return to the ward, the patient's colour was noted to be poor, and oxygen was administered. She remained stuporous until four hours after the operation, when she complained of pain and was given morphine sulphate gr. 1/6. After twelve hours the cyanosis cleared and she rested well.

During the next seven days the patient never regained consciousness or spoke, although purposeless movements were made with the left arm and hand. The neurological picture was one of decortication, and signs of meningeal irritation developed on the fifth day in the form of nuchal rigidity. On the sixth day facial grimaces were noted and the abdominal reflexes could not be elicited. On the following day repeated generalized convulsions occurred, with marked opisthotonos, and the patient died seven days and six hours following operation.

A survey of the literature does not disclose a similar previous report or any reference to brain damage resulting from the use of cyclopropane. Degenerative changes in the brain following nitrous oxide anæsthesia have been reported by several observers. The authors attribute the above complication of cyclopropane anæsthesia to tissue or cellular anoxæmia, because, as with nitrous oxide, the mechanism of its effect both in the production of anæsthesia and brain degeneration depends in part on anoxæmia, but unlike with nitrous oxide the anoxæmia is localized and clinical cyanosis is lacking. Hence there is a possibility of degenerative changes in the brain occurring even in the presence of a good colour throughout the maintenance of anæsthesia. F. ARTHUR H. WILKINSON

Hygiene and Public Health

The National Health Survey: 1935-1936: An Estimate of the Amount of Disabling Illness in the Country as a Whole. *Bull. No. 1, Div. of Public Health Methods,* U.S. Public Health Service, Washington, D.C., 1938.

During the fall and winter of 1935-1936 the United States Public Health Service, with the aid of grants from the Works Progress Administration, inquired into the state of the nation's health by means of a house-to-house canvass of 740,000 families in urban communities in 19 states and 36,000 families in selected rural areas in 3 states. Actually some 2,600,000 persons were involved in the survey.

At the time of the survey (fall and winter) 4.5 per cent of the population surveyed were reported as being disabled on the day of the canvass. There was a much higher incidence of disability among the older persons than among the younger (12.1 per cent of those over 65 were disabled, 2.5 per cent of those between 15 and 24 years). In addition to recording those who were actually sick at the time of the survey information was secured from every individual regarding his sickness experience during the preceding 12 months. On the basis only of illnesses which incapacitate for one week or longer it was found that 172 persons per 1,000 suffered a disability averaging a loss of time of 57 days. Applying this experience to the whole population, well and sick, the average loss of time from sickness disabling for a week or longer per person is 10 days. The following table shows the frequency, severity and disability rates:

Age group	*Frequency rate Disabling illness per 1,000 persons*	*Severity rate Days of disability per case*	*Disability rate Annual days of disability per person*
All ages	172	57	9.8
Under 15	232	26	6.0
15 to 64	144	63	9.1
65 and over	265	123	32.6

Attention should be drawn to the fact that the diseases here referred to are those which disabled for more than one week. It is probable that a greater number of minor diseases disabled for less than a week. These will be recorded in a later report.

With regard to the causes of the disabilities recorded the following table gives them in broad diagnosis groups:

Diagnosis group	*Disabling illnesses per 1,000 persons*	*Annual days of disability per person*
All causes	172	9.8
Infections	29	0.7
*Respiratory (chiefly acute)	47	0.9
Digestive (chiefly acute)	9	0.4
Puerperal state	15	0.5
Accidents	16	0.7
Chronic diseases	46	6.3
All other causes	10	0.8

Other data which are recorded in this bulletin are the prevalence of gross impairments, such as loss of limb, blindness, deafness, etc., and a more detailed list of causes of illness.

FRANK G. PEDLEY

The National Health Survey: 1935-1936: Illness and Medical Care in Relation to Economic Status. *Bull. No. 2, Div. of Public Health Methods,* U.S. Public Health Service, Washington, 1938.

The data recorded in this bulletin refer to the

* The common cold does not usually disable for 7 days. Many disabilities from this cause, therefore, would not be included in this figure.

sickness, medical, nursing and hospital care of the 2¼ million persons canvassed, according to their economic status. Forty per cent of the canvassed population were in families with annual incomes under $1,000. Almost half of these had been in receipt of relief during the year. Eighty per cent of the population were in families with annual incomes under $2,000.

All surveys of this type have shown that the frequency of illness is highest among the poor. In this survey illnesses disabling for more than one week occurred at a rate 57 per cent higher than among families with annual incomes of $3,000 and over.

	Disabling illnesses per 1,000 persons during a 12-month period		
Annual family income and relief status	*All illnesses*	*Less than 3 months' duration*	*Over 3 months' duration*
All incomes	172	124	43
Relief families	234	163	71
Non-relief under $1,000	174	119	54
$1,000 to $2,000	155	117	38
$2,000 to $3,000	150	113	37
$3,000 and over	149	111	38

Medical care.—Thirty per cent of those with disabling illnesses received no medical care in the relief families, 28 per cent in non-relief families with incomes under $1,000, and 17 per cent in families with incomes over $3,000. One per cent of those with disabling illnesses received nursing care in the relief families, 12 per cent in families over $3,000. Thirteen per cent received care from a visiting nurse, however, in the relief group, and only 3 per cent in families with incomes over $3,000.

The following table shows hospital care according to economic status.

Annual family income and relief status	*Hospital cases per 1,000 persons*	*Proportion of disabling cases hospitalized*
All incomes	46.7	27.1
Relief	62.8	26.8
Non-relief under $1,000	41.5	23.9
$1,000 to $2,000	43.3	28.0
$2,000 to $3,000	43.6	29.2
$3,000 and over	45.4	30.4

FRANK G. PEDLEY

APHORISMS FROM BACON

A wise man will make more opportunities than he finds.

A cripple in the right way may beat a racer in the wrong one.

Discretion of speech is more than eloquence.

There is surely no greater wisdom than well to time the beginnings and outsets of things.

The virtue of prosperity is temperance; the virtue of adversity is *fortitude*.

Virtue is like a rich stone, best plain set.

Obituaries

Dr. Robert Tait McKenzie, distinguished Canadian born sculptor and physician, died suddenly at his home in Philadelphia, on April 28, 1938, aged seventy.

Dr. McKenzie was born in Almonte, Ont., in May, 1867, the son of Rev. William McKenzie and Catherine Shields McKenzie. Educated first at the Ottawa Collegiate Institute, Dr. McKenzie graduated in medicine from McGill University in 1892. Subsequently he was a house surgeon at the Montreal General Hospital, a ship's surgeon, and house physician to the Earl and Countess of Aberdeen when Lord Aberdeen was Governor-General in 1897.

Dr. McKenzie came to McGill first as a student in 1885. He was a lecturer in anatomy and physical education, and physical director at the university from 1894 to 1904. He left to become physical director at the University of Pennsylvania. He was eminent in two separate fields, as a specialist in physical education and as a sculptor. Among the more important of his works which may be mentioned are the memorial to commemorate sixty-years of Confederation, in the House of Commons, Ottawa; also in the Parliament Buildings is the Baker Memorial. The King's collection of art at Balmoral Castle, Scotland, includes his "Blighty". In the Princes' Street Gardens, Edinburgh, is his statue, "The Call", a kilted warrior ready to go to Flanders' Fields. "The Sprinter", waiting for the starting gun, in Fitzwillian Museum, Cambridge, England; and "The Plunger", ready to dive in Boston's University Club, are his. His also are the Delano Memorial at Washington and the General James Wolfe Statue in Greenwich Royal Park, London, a gift from the people of Canada to the people of England. Other work is permanently shown in the Canadian National Gallery, Ottawa, the Montreal Art Gallery, Oxford University, and a number of United States museums and colleges. One of his masterpieces, "The Brothers of the Wind", is now in the possession of McGill University. It was given by Dr. McKenzie for the projected Sir Arthur Currie Memorial Gymnasium and Armory. It will remain in the Douglas Hall of Residence until the gymnasium is built. He also executed many striking friezes. He was awarded the King's medal by Gustavus V. of Sweden for distinguished service in sculpture at the 1912 Olympic games.

Dr. McKenzie was a member of the Royal Canadian Academy, a former president of the American Physical Education Association, president of the Society of Directors of Physical Education in Colleges, and a Fellow of the Philadelphia College of Physicians and Surgeons. During the Great War he was a temporary major in the Royal Army Medical Corps, an inspector of physical training for the British forces, and later in the war medical officer in charge of the Heaton Park Command depot.

McGill University in 1921 bestowed on Dr. McKenzie its highest honour. At the centennial celebration of its founding, and in the presence of hundreds of returned graduates, the distinguished sculptor and former physical director of the university received the honorary degree of Doctor of Laws.

Dr. McKenzie lived near the University of Philadelphia with which he was connected since 1904 and spent his summers at Kintail, his summer resort at Almonte, Ont.

Mrs. McKenzie, the former Ethel O'Neil, of Hamilton, Ont., survives, as do two brothers, Rev. William P. McKenzie, Boston, and Bertram Stewart McKenzie, Ottawa, and a sister, Mrs. Gilbert Pritchard, Boston.

Dr. Sylvester Ernest Charlton, of Galt, Ont., died on April 7, 1938, in his seventy-first year. He was born on a farm in Lobo Township, Middlesex County, near London. He received his public school education there

and at the age of 17 he enrolled at the Collegiate Institute at Strathroy, and subsequently attended the Galt Collegiate Institute. After teaching school for two years and a half at Killean and three years at Clyde he began his study of medicine at the University of Toronto Medical School from which he graduated with honours (1900). He then visited hospitals of London and Edinburgh and in September, 1900, began active practice in the village of Hespeler. Six years later, in 1906, he moved to Galt and for 20 years carried on a successful practice.

Dr. Charles was mayor of Galt in 1921 and 1922, elected by acclamation.

Dr. Elzear Montpetit, of Montreal, died on April 19, 1938. He was a graduate of Laval University Medical School, Montreal (1893).

Dr. Herbert Gladstone Murray, of Owen Sound, Ont., died on April 18, 1938. He was sixty-four years of age. He was born at Paisley, Scotland, son of the late William Murray, came to Canada in 1883, and received his education in the Owen Sound public schools and collegiate institute. He graduated in medicine from Queen's University, Kingston (1896). He obtained his F.R.C.S. Edin. in 1911. Since 1910 he had been M.O.H. for Owen Sound.

Dr. George Robinson Pirie, of Toronto, died on May 4, 1938, aged fifty-eight. He was physician to the Hospital for Sick Children and Associate in Pædiatrics at the University of Toronto.

Dr. Pirie was born in Clinton, Ont., and received his earlier education at Dundas school and Humberside Collegiate, graduating in medicine from the University of Toronto in 1901. He took post-graduate courses in New York and in London, Eng., and as a result received his M.R.C.P. and L.R.C.S. (1915). He later became M.R.C.P. (1919) and F.R.C.P. (1931). While in England he was on the staff of the great Ormond Street Children's Hospital, London. He practised in Calgary for several years.

Dr. Pirie was married twice and is survived by his widow, Marguerite Hess; a daughter by his first wife, Miss Margaret Walsh Pirie, and two daughters of his second wife, Ann Joslin and Jane Robinson Pirie, and his mother, Mrs. Margaret J. J. Pirie; all of Toronto.

Dr. Jean Solomon Taupier, of Chambly, Que., was accidentally killed in a motor accident on April 23, 1938. He was 86 years old. He was at one time mayor of Chambly and was one of the oldest practising physicians in the province.

News Items

Alberta

Some years ago the Supreme Court of Alberta ruled that when a doctor made an emergency call on an indigent resident he could not collect for work other than advice, attendance and medicine; that is, if an operation were necessary, this had to be postponed until a written order was given by a municipal authority, or the physician had to take the responsibility and do the work free. The matter has been rectified in the new Act which reads as follows.

"When an indigent resident receives medical advice, attendance, medicine or other treatment given by a medical practitioner at a first visit or during the first 24 hours, the municipal district shall be liable to pay the medical practitioner any reasonable charges in respect of such services, notwithstanding the absence of a written order, if the medical practitioner concerned, certifies that the case was, or that he was informed that the case was, one of sudden and urgent necessity.

"Provided however that the municipal district shall not be liable for any charges, other than for the services rendered during the first twenty-four hours after the medical practitioner sees the indigent resident, unless the medical practitioner is authorized to continue to treat the said indigent resident by a written order from a proper officer of the municipal district."

The Hon. W. W. Cross, Provincial Minister of Health, stated recently, that, "The Department of Health has under investigation at the present time the feasibility of extending the work of the Workmen's Compensation Board, to include the hospitalization and medical attention necessary for the care of all maternity cases and all specific diseases. That the Board already has the machinery necessary for accident insurance, contributed to both by the worker and the employer. At first this would only apply to industry, but, if found to be financially sound, it can then be extended to all forms of occupation. Until we receive a full report of this investigation, we intend to carry on, taking over the care of the most pressing cases so far as finances will permit."

The Workmen's Compensation Act has been amended to raise the age of children who are the responsibility of the Board to 18 years instead of 16 as formerly. Further, they have chosen a panel of 40 medical practitioners, from which a medical board is chosen to examine an injured workman whose claim is in dispute, with the decision of the medical board being final. Some workmen, by continually complaining, have had in some instances as many as seventeen doctors see and treat their cases.

The Council of the College of Physicians and Surgeons of Alberta has been pressing for the creation of a government fund from which the cost of medical care and hospitalization for those injured in motor accidents would be paid. The matter was left to the Government "caucus", which turned it down.

The Council is making a survey of the dried-out areas as to what is necessary to render adequate medical services to the people who still remain there. In some areas where there were formerly four doctors now none remain, as the people on relief have no money to pay for medical attention.

The Department of Health is taking steps to establish a new health unit adjacent to Edmonton, and, from the response of the various Councils, the plan will be announced shortly.

The Government Travelling Health Clinic is starting now, and from the report of the itinerary it is rendering medical assistance where such would not be available otherwise.

An invitation was extended to members of the Calgary Medical Society, to visit the Provincial Mental Hospital at Ponoka on May 4, 1938. Thirty-one physicians availed themselves of this opportunity, and a thoroughly interesting and profitable afternoon was spent. They were shown through the representative wards and visited the occupational and other special departments. Following this, papers were read and cases presented by members of the staff of this institution.

Dr. R. R. MacLean, Superintendent acted as Chairman and gave the introductory remarks on the various subjects and discussions which took place. The following program was presented: "Insulin therapy", by Dr. A. R. Schrag; "Post-partum psychosis", by Dr. G. C. Michie; "Neurosyphilis", by Drs. A. D. McPherson and R. C. Hamilton; "Post-mortems in mental hospitals", by Dr. R. K. Thomson.

According to Dr. W. H. Hill, D.P.H., Medical Officer of Calgary, cancer was responsible for nearly 16 per cent of the 641 deaths which occurred in this city in 1937, while diseases of the heart, arteries, kidneys, accounted for 46 per cent. The maternal mortality was 6.1 per 1,000 live births. During the year there were 1,643 live births, or 19.2 per 1,000 population.

G. E. LEARMONTH

British Columbia

A successful health exposition was held under the joint auspices of the Greater Vancouver Health League and the Vancouver Medical Association during the week of April 11th. There was an estimated attendance of 10,000 at the various lectures and demonstrations held at the Hotel Vancouver.

The 26th Annual Meeting of the British Columbia Registered Nurses' Association was held in Victoria on April 22nd. A proposed new curriculum in hospital training and the forthcoming biennial meeting of the national body in Halifax were subjects of discussion. In her presidential report, Miss Fairley, of Vancouver, stated that up to the end of March only 14 per cent of the registered nurses in the province had enrolled for special service in war or other emergencies.

Plans for the first unit of a $500,000 hospital for the Sisters of Charity are now under preparation. St. Vincent's Hospital, as the new institution will be named, will have more than 200 beds. Two additional wings will be built after the first section is in operation. The building will be of reinforced concrete in a modern design. The power house and laundry building will be separate from the main building.

D. E. H. CLEVELAND

Manitoba

The Sisters of Charity of St. Boniface Hospital (Grey Nuns) have announced that a new out-patient building and dispensary will be erected to the south of the hospital and that construction will begin immediately. The building which will be connected with the hospital by a tunnel will be 142 x 141 ft. and will be L-shaped. There will be a main floor and a high basement. The estimated cost is $95,000.

The city of St. Boniface is turning the waste land to the east of the hospital into a park. The statue to La Verandrye, the first white man to explore the Canadian west, will be erected in this park next September.

C. Rufus Rorem, Ph.D., Director of the Committee on Hospital Service of the American Hospital Association, was the guest at a luncheon in the Winnipeg General Hospital on May 13th. Following this he addressed a meeting in the reception room of the Nurses' Home on "The Manitoba hospital service plan". The meeting was arranged by the Winnipeg Medical Society.

ROSS MITCHELL

New Brunswick

The increasing importance of the Department of Laboratories under the Ministry of Health of the province has recently been exemplified by the large amount of work done by the Director, Dr. R. A. H. Mackeen, and his staff, along medico-legal lines. Several interesting cases in various courts in the province have required his attendance. Most of these cases have centred about alleged homicides.

Dr. M. H. McKinnon has moved to Woodstock, where he will practise in future.

The Public Health Officers of the Province of New Brunswick recently held a two-day meeting in Fredericton under the Chairmanship of the Chief Medical Officer, Dr. William Warwick.

Dr. M. A. Oulton, of Saint John, was recently elected President of the Saint John Red Cross Society.

Lieut.-Col. V. D. Davidson, R.C.A.M.C., was recently granted the Efficiency Decoration.

Dr. George Skinner, of the surgical staff of the Saint John General Hospital, attended the meeting of the Society of Thoracic Surgeons at New York.

A. STANLEY KIRKLAND

Nova Scotia

The organization of a Cape Breton Hospital Council was begun recently at a meeting of the nursing heads from Sydney, Glace Bay, New Waterford, North Sydney and Sydney Mines. Membership will be open to the heads of hospitals, their assistants and to instructresses. The objects will be the improvement of equipment and of teaching in the nursing schools, the unification of methods, interchange of ideas, and all projects which may lead to the betterment of hospital service on the island.

A new bungalow hospital for Annapolis was discussed at a meeting of the town council, when Dr. Sutherland and Dr. Mahaney presented the matter and gave advice as to the details of construction, site and equipment. The proposed building would have fifteen beds and would relieve the congestion at the adjoining Digby hospital which is badly overcrowded.

Dr. Nikolaus B. Dreyer, head of the Department of Pharmacology at Dalhousie University has resigned his post to become director of research for the Sandos Chemical Company of New York. A native of South Africa, Dr. Dreyer has been associated with Dalhousie since 1923, with the exception of four years from 1927 to 1931, when he served at McGill as professor of Physiology. On first coming to Dalhousie Dr. Dreyer was associated with Dr. Babkin in the physiology department, later returning to become Professor of Pharmacology. Dr. Dreyer holds baccalaurate degrees in arts from Cape and Oxford, a master's degree from Oxford, and is an M.R.C.S. (England) and L.R.C.P. (London). Popular with both faculty and student body, Dr. Dreyer's place at Dalhousie will be difficult to fill.

A general medical clinic for the public schools of Baddeck was proposed at a recent meeting of the home and school club, and the matter is to be taken up with the Department of Public Health.

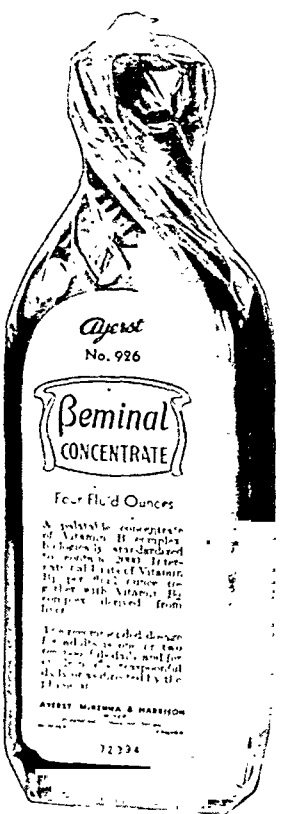
In a vote held in Sydney 1,532 parents expressed themselves as in favour of diphtheria immunization for their children of ten years and under, while 242 voted against the proposed measure.

The new Kentville general hospital will open about July 1st.

A Dominion Government Commission, consisting of Dr. J. G. FitzGerald (chairman), Dr. Alphonse Lessard and Dr. H. G. Grant, met in Halifax to investigate the recent small-pox outbreak at that port.

The steel and car workers union of Pictou, in their regular meeting, considered the county tuberculosis problem and recommended that the Provincial Government be approached with a view to erecting a tuberculosis hospital annex at Pictou.

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Dr. R. Burnell Eaton, Wolfville (Dalhousie '32), has been awarded his F.R.C.S. at London, and has accepted an appointment at the Middlesex County Hospital.

Routine examination of all the children of the Indian reserve at Truro will be carried out by the Department of Health, in an effort to reduce the mortality from tuberculosis to which the Indians are so susceptible. ARTHUR L. MURPHY

Ontario

Construction of a 111 bed addition to the Fort William Sanatorium will probably begin this month. It will be of three stories, solid brick, and styled similar to the main building. The estimated cost of the addition is $135,000.00.

A new wing is to be added to the Listowel Memorial Hospital. The addition has been under construction for some time. The Hospital Board proposes spending some $30,000 for this addition which will be a complete and efficient wing.

An amendment to the Health Act of the Province of Ontario relates to the control of carriers of communicable diseases. The carrier may be isolated in any premises or locality. The Medical Officer of Health may prohibit him from doing any work which may convey his disease to others. The Act also provides that if such a person is to be deprived of his means of livelihood, the Medical Officer of Health may compensate him from the provincial treasury.

In Ottawa, where it is said there are 500 men on the relief list who hold medical certificates that they are unable to work, a Medical Board has been set up for the purpose of reviewing these certificates and making clinical examinations of those who claim to be physically unfit for labour. The Board, as appointed, is composed of Drs. Campbell Laidlaw, J. H. Lapointe, and Clarence H. Brown.

Dr. Peter McLaughlin, Chief District Coroner of Dundas County for twenty-five years, Medical Officer of Health for Winchester, village and township, has recently celebrated fifty years of continuous practice, having graduated at Trinity Medical College, Toronto, in 1888. J. H. ELLIOTT

Quebec

Dr. A. H. Gordon, Professor of Medicine, McGill University, and Senior Physician to the Montreal General Hospital, has been recently elected president of the American Clinical and Climatological Society.

Saskatchewan

Dr. B. C. Leech, head of the department of anæsthesia of the Regina General Hospital gave his report for the year 1937 at the May staff meeting. His assistant, Dr. J. E. McCutcheon, gave the analysis of cases. The resident in anæsthesia, Dr. Elizabeth Fisher, spoke of complications. Total hospital anæsthetics given in 1937 were 2,811, of these 1,518 were ether, 90 were nitrous oxide, 1,022 were cyclopropane, 2 were rectal avertin, 1 was sacral, 156 were spinals, 14 were intravenous. There were no deaths on the table.

Ten cases of major respiratory complications ended fatally. There were 6 major respiratory complications in patients who recovered. There were 2 cases of cardiac embarrassment resulting in death.

Dr. Leech described the method of episubdural anæsthesia which has been started in the department, and announced that the series is being very carefully studied and all results fully recorded.

LILLIAN A. CHASE

General

Report of the Trustees of the Banting Research Foundation for 1936-37

A ten-year period has elapsed since the first group of grants was made by the Trustees of the Foundation. During this period grants have been made annually, in accordance with the Charter, to the Department of Medical Research under Sir Frederick Banting; and also 184 grants have been made to 110 persons distributed throughout Canada as follows— Brandon College 1; Dalhousie University 10; McGill University 18; Queen's University 2; University of Alberta 3; University of British Columbia 1; University of Manitoba 13, University of Saskatchewan 2; University of Toronto 56; University of Western Ontario 5.

During the year 1936-37, twenty-seven workers received grants from the Foundation and 24 papers have been published as the result of grants made in this or previous years by the Foundation. The following brief comments may be made on the grants made during the year:

B. F. Crocker, University of Toronto.—A new method is being employed for the study of the process of digestion in dogs and satisfactory progress is being made.

Dr. J. C. Goodwin, University of Toronto.—A further payment was made to this worker in order to have a technical analysis of the report made on the observations made in regard to the relationship between the inter-racial origin of parents and the progress of labour.

Dr. E. R. Grant, McGill University.—On the cause of otosclerosis.

Dr. A. W. Ham, University of Toronto.—A valuable research was carried out on the changes in joint cartilage produced by vitamin C.

Mrs. H. T. Malloy and K. A. Evelyn, McGill University.—On the determination of bile in blood, using the new photoelectric colorimeter.

B. Schachter, University of Toronto.—Purification of the gonadotropic substance in human pregnancy urine.

Drs. D. L. Selby and R. W. I. Urquhart, University of Toronto.—On the effect of experimental unilateral nephrosis on the secretion of urine.

Dr. S. Weinstein, University of Toronto.—An attempt to crystalize prolan.

Drs. R. F. Wilkinson and R. G. MacKenzie, University of Toronto.—A clinical study of the prevention of thrombosis in man by means of heparin.

R. J. Wilson, University of British Columbia.—A study of the type of staphylococcus which produces food poisoning in man.

Dr. B. Chown, University of Manitoba.—On some types of kidney disease which are probably due to an excess of mineral secretion.

Dr. D. Beall, University of Toronto.—An attempt to introduce an amino group in œstrone and œstrodiol.

Dr. G. H. Ettinger, Queen's University.—An endeavour to account for the large amount of acetylcholine contained in the placenta.

E. J. Reedman, University of Toronto.—On free and combined vitamin C.

V. E. HENDERSON,
A. W. HAM,
Honorary Secretaries.

Dr. W. J. McNally, oto-laryngologist at the Royal Victoria Hospital, Montreal, has been advised by the Royal Society of Medicine in London that he has been



POINTS

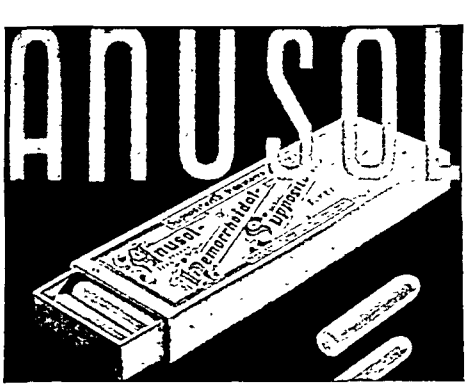
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awarded the Dalby Prize for the best work in his field during the past five years.

The prize, established 15 years ago, is world-wide in scope and is only awarded every five years. It has been awarded twice before, once to an Austrian, and the second time to a Scotsman. Dr. McNally is the first to bring this prize to the North American continent. The award consists of 100 guineas. No preparatory research or treatise is judged by the committee in awarding it, but individual records are kept of the work done by prominent men in this branch of medicine and it is on these records that the award is made.

Dr. McNally has been attached to the Royal Victoria Hospital since 1922. He is a graduate of Dalhousie University and following his graduation came to McGill University, where he received his Master of Science degree in 1925. The degree of Doctor of Science was conferred on him by McGill in 1934, and he is now lecturer in oto-laryngology at the university.

The 38th Annual Meeting of the Canadian Tuberculosis Association, meeting conjointly with the Michigan Trudeau Society and the Ontario Laennec Society, will be held on June 10th and 11th at the Hotel London, London, Ont.

The Tenth International Medical Congress for Psychotherapy will be held at Balliol College, Oxford, England, from Friday, July 29 to Tuesday, August 2, 1938. The main subjects to be discussed are: (1) psychology of the phases of life, and (2) psychotherapy and psycho-somatic problems. The long contributions (45 minutes) will be given in the form of read papers. It is hoped that the shorter contributions (30 minutes and 20 minutes) will be in the form of lectures based on notes. There will be ample time provided for the discussion of all contributions. Those wishing to offer papers should communicate with the Hon. Secretary without delay. The languages of the Congress will be English, German and French. Synopses of papers will be provided in all three languages, and discussions will be interpreted.

Business Secretary, M. H. Gibbs-Smith, Office (until July 28th), 106 Brompton Road, London, S.W.3, England. President, Professor C. G. Jung.

At a meeting of the Royal College of Physicians of London, held on April 28th, Dr. Stanley Graham Ross and Prof. James Bertram Collip, both of Montreal, were elected Fellows.

At a meeting of the Council of the British College of Obstetricians and Gynæcologists held on April 23rd, Drs. W. A. B. Bauld and G. C. Melhado, both of Montreal, and H. B. Van Wyck, of Toronto, were promoted to Fellowship.

The following were admitted to Membership: Drs. Elinor F. E. Black, of Winnipeg, B. E. Meek, of Toronto, C. V. Ward and J. C. Whyte, both of Montreal.

The following were elected to the Membership: Drs. F. G. MacGuinness, of Winnipeg, and G. J. Strean, of Montreal.

A Review Course in Medicine and Pathology (including applied Anatomy and Physiology) preparatory to the final examination of the **Royal College of Physicians of Canada**, will be given in Montreal by Drs. Chase, Ross and Scriver, during the month of September, 1938. The course will comprise a systematic review of Medicine and Pathology by means of discussions, demonstrations, clinical presentations, and supplementary readings.

Fee $50.00. Applications will be accepted to a limited number in order of their receipt. Address all applications and inquiries to: Dr. Walter de M. Scriver, Suit 9, 1374 Sherbrooke Street West, Montreal.

Book Reviews

The Treatment of Clinical and Laboratory Data. D. Mainland, M.B., Ch.B., D.Sc. 340 pp. 15s. Oliver & Boyd, Edinburgh, 1938.

"I have no faith in anything short of actual measurement", so stated Charles Darwin, and his cousin, Francis Galton, the founder of modern biometry, warned that "general impressions are not to be trusted." Whether a general impression obtained from a mass of data is, or is not, in accord with the facts in any given case may be tested by subjecting the data to statistical treatment and in no branch of science is such treatment more necessary than in medicine because of the biological variables. Also, no training affords a greater discipline of scientific methods than statistics; science is no more and no less than organized knowledge, and it is statistics which teaches the experimenter how to collect and assort data and how to avoid that not uncommon error of adding "cabbages and cows" and drawing conclusions from the results. A knowledge of statistics helps to create a healthy skepticism towards all data. Unfortunately, the terror of the terminology alone prevents many with no mathematical aptitude from even attempting to learn the technique. To the uninitiated, variate, mean, median, mode, quartiles, standard deviation, coefficiency variation are terrifying words. Each, however, lends itself to simple explanation and thus to more wide practical application. This is the purpose of Professor Mainland's book—to put into the hands of the uninitiated, in a simple understandable form, the different means available for testing the reliability of conclusions drawn from experimental data. This book is not, nor does the author claim it to be, complete. It is, however, sufficiently complete for ordinary purposes. The author has deliberately omitted "too much and too complicated detail". For more advanced methods which may be required at times the reader must also seek elsewhere and a sufficient number of references are given for this purpose. To thoroughly understand that which the book does deal with, the author warns, and rightly so, that all of the chapters should be read through consecutively. To the uninitiated this book should serve a very useful purpose.

A Textbook of Clinical Pathology. Edited by R. R. Kracke, B.S., M.D. 567 pp., illust. $6.00. Wm. Wood, Baltimore, 1938.

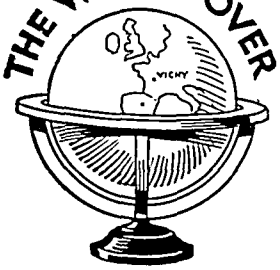
This book is the work of a well qualified group consisting of pathologists and clinicians. The preface states that "for many years the late Dr. Foster M. Johns, of Tulane University, had planned to edit a comprehensive treatise on clinical pathology in which he had enlisted the collaboration of teachers in several medical schools. This work was nearly finished at the time of his death in 1936." Dr. Kracke has ably completed the work along the lines indicated by Dr. Johns.

Those engaged in clinical pathology will appreciate the many excellent features of this work. As an example, the second chapter is particularly valuable from a practical point of view. It contains much information usually only secured after the consultation of several books, *e.g.*, preparation of reagents, stains and selected culture media; a table showing the solubility of dyes; another giving international atomic weights; finally a complete list of normal standards. Chapter 20 is another valuable one. It deals with the examination of fæces, a procedure that is, in temperate climates, too often neglected by the clinician, and imperfectly carried out by the laboratory worker. In other chapters the full range of procedures involved in clinical pathology is covered. Methods described are all reliable, and the descriptions are clearly given.

This book is one of the best in its class that this reviewer has seen. It can be warmly recommended as

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Classified Advertisements

TUTORIALS IN SURGERY in preparation for the Final Examinations for the F.R.C.S. (Canada) will be held by permission at the Montreal General Hospital from September 6 to October 22, 1938, inclusive, and will consist of demonstrations of patients, ward rounds, operations, surgical pathology, and supervision of reading. Candidates desiring to take this course are invited to apply at once for advice regarding preliminary reading. The class is limited to the first ten candidates whose applications are accepted. Details on application to Dr. R. R. Fitzgerald, F.R.C.S. (England and C.), 1414 Drummond Street, Montreal.

SECRETARY.—The Canadian Society for the Control of Cancer is looking for a Medical Secretary. He must be under forty-five, must have had at least ten years of clinical experience—good address, ability as a speaker; and must possess enthusiasm for this particular branch of work. Applications giving full particulars of qualifications, together with photograph and references, and stating salary required should be addressed to the Canadian Society for the Control of Cancer, 184 College Street, Toronto.

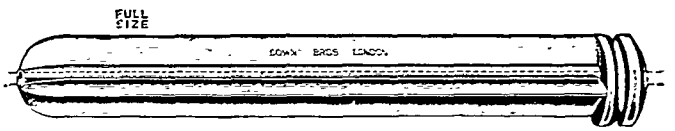
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Post-graduate Surgery. Edited by R. Maingot, F.R.C.S. (E.). Vol. 3, 2,000 pp., illust. $45.00 (3 vols.). Appleton-Century, New York, 1937.

This volume is printed on an excellent quality of paper. The illustrations are unusually clear. The spacing of the type is greater than usual in conformity with the distance between lines. Each contributor has been given a subject in which he has attained prominence. The book is written for the surgeon who has done surgery and wishes to keep abreast of the proved and the new.

Chapters are devoted to herniæ of all known sites, plastics, obstetrics, ear, nose, pharynx, lymphatic and vascular systems, orthopædics, physical medicine, x-ray therapy, mandible, neurology, endoscopy, psychiatric aspects of surgery, and the medical treatment of the surgical patient. The chapters on vascular surgery (heart, peripheral and lymphatic) are most complete and comprehensive. It would be difficult to find a more complete monograph on hernia.

A criticism which might be made would be the large size of the book. On the other hand, it is the sort of a book one would gladly rise early to read; it is as invigorating as the early morning fishing on a northern lake in June.

Clinical Roentgen Therapy. Various authors. Edited by E. A. Pohle, M.D., Ph.D., F.A.C.R. 819 pp., illust. $10.00. Lea & Febiger, Phila., 1938.

The idea of this book originated with the late Dr. P. M. Hickey, of Ann Arbor, with whom the editor was at that time associated. Until his death in 1930 Dr. Hickey acted in an advisory capacity. This book is an edited volume and the numerous contributors have each written a monograph on one of the following subjects: Diseases of the Blood and Blood-Forming Organs, Diseases of the Circulatory System, Diseases of the Respiratory System and of the Breast, Diseases of the Gastro-Intestinal Tract, including its Glands, Diseases of the Female Genital Organs, Diseases of the Urinary Tract and Male Genital Organs, Diseases of the Nervous System, Diseases of the Muscles, Tendons, Bones and Joints, Diseases of the Skin, Roentgen-ray Reactions and Injuries. The following appendices have been added: The Medico-Legal Aspect of Injuries following the Application of Roentgen Rays, which is dealt with in the first appendix; the second appendix deals with the Salivary Glands and Diphtheria Carriers. I know of no English book dealing so comprehensively with these subjects, and the large number of contributors not only vastly increases the authenticity of the book, but permits the publication of such a treatise more quickly than if the subject had to be covered by one person. This is a most excellent book and fills a long felt need, and, although the treatment with roentgen rays is still subject to various changes from time to time, as an initial book in this subject there is little to criticize adversely. This is a book that every radiologist can ill afford to be without.

X-rays and Radium in the Treatment of Diseases of the Skin. G. M. MacKee, M.D. 3rd ed., 830 pp., illust. $10.00. Lea & Febiger, Phila., 1938.

The third edition of this important book offers a much greater contrast to the last edition, which appeared eleven years ago, than that did to its predecessor. The author in the preface indicates his belief that it marks a new stage in the advance of dermatological therapy. He states that x-rays are now employed less frequently in dermatology, and possibly the future may show a further relative decrease. But Pusey's statement, again quoted, that "roentgen therapy is the most widely useful addition to the treatment of skin diseases that has been made" is as true as ever. Roentgen therapy is settling down into its legitimate place in the treatment of skin disease. It has a large field and the increasing recognition of its boundaries but enhances its value. Other methods will accomplish as much in some conditions, with more certainty and safety; and where x-rays are used the best results are often obtained only with the employment of auxiliary agencies.

MacKee is only expressing the consensus of well-trained dermatologists which is reflected in their practice. Unfortunately, not all who use this agency can claim to be dermatologists in any sense of the word. Here lies the danger, and the author's remark that "for the treatment of skin diseases the physician who gives or supervises the treatment should be a capable dermatologist and dermato-radiologist" needs reiterated emphasis.

The fact that there is today fairly exact knowledge of the nature, biological action, therapeutic effect and technique of x-rays and radium, although many who are using x-rays appear to be oblivious of this, is ample justification for the first twenty-five chapters, half of the book, which are devoted to the consideration of these subjects. Edith Quimby, Associate Physicist to the Memorial Hospital, New York, has collaborated in writing the greater part of this and has done a notable piece of work.

The revision has been most thorough, including the rewriting of most of the chapters, and the author has been assisted by a group of able collaborators.

In spite of the great amount of new material introduced, so careful has been the selecting and discarding, that less than thirty pages have been added to the size of the book. A reader familiar with the two former editions will note with pleasure how old illustrations have frequently been replaced by new and better ones, and more and clearer diagrams added. As a new and up-to-the-minute book it retains the pre-eminence which it gained with its first edition.

For the dermatologist this book is indispensable. It is not less valuable to the radiologist who may on occasion be obliged to treat skin diseases with x-rays or radium.

Studies on the Physiology of the Eye. J. G. Byrne, M.D. Revised edition, 424 pp., illust. 40s. H. K. Lewis, London, 1938.

This work is so erudite and replete with facts that it is beyond the ability of the ordinary reviewer to give an adequate idea of its contents. It would take one not only with an expert knowledge of ophthalmology but with a deep understanding of experimental physiology to do this. For one with a flair for research and who wishes to know the "why and the wherefore" of things doubtless the book will have a strong appeal.

Dr. Byrne's book gives the result of his studies during the past twenty years in the laboratories of various universities in England, France, Holland, Germany and the United States. He considers such subjects as dilatation of the pupil, constriction of the pupil, widening and narrowing of the palpebral fissure, the orbicularis phenomenon, movement of the pupil and lens, exophthalmos and enophthalmos. He traces the pathways of the various nervous impulses that effect these phenomena. He notes the results of stimulation of various nerves, ordinary, sympathetic and parasympathetic on the motor mechanisms of the eye. The last part of the book gives a most interesting discussion of inherent pupil constrictor tonus, and the mechanism of the still reaction, sleep, dreams, hibernation, repression, hypnosis, narcosis, coma, and related conditions.

On the basis of his painstaking and well-conceived experiments the author believes that the relations which he has established "furnish the means for a better understanding of the different factors concerned in the physiology of vision" and also "furnish the means for a better understanding of the physiological processes that underlie, or are associated with, all mental activity, and consequently may furnish in addition the solid foundation for a therapy—preventive and restorative, based upon psychoanalysis — which shall not be too

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mystifying or metaphysical, but scientific and practical, and above all available for extensive use by the medical practitioner."

Obesity. W. F. Christie, M.D. 204 pp. $3.75. Macmillan, Toronto, 1937.

The only justification, in the reviewer's opinion, for any addition to the numerous books which deal with obesity is either something new to say or a new and more instructive manner of presenting that which is known. In 200 pages the author describes his experiences with 200 of his own cases of obesity and draws upon a number of well-known published works for the remainder of the observations. About one-third of the pages of this book is devoted to an outline of the well-known facts of the physiology of fat, the different causes of obesity, and certain clinical facts of diagnosis which are equally well known. The "before and after" illustrations which occupy some space, though they may be instructive to laymen, offer nothing new, since this book is meant for physicians. A number of the illustrations could have been · · · · · ·ed. For example, in the "before and · · · · on page 72 (Fig. 15) the results of the treatment are exaggerated because the two photographs are not comparable with respect to the height of the subject. About one-half of the book is devoted to menus, recipes (eight pages to soup alone), and the well-known and widely-recorded food values, whereas, two pages only are devoted to muscular exercises, the importance of which is almost equal to that of diet, and the successful use of which depends upon consideration of a number of physiological facts which are not generally appreciated. This chapter could have been much enlarged at the expense of the space devoted to recipes and food values with very appreciable benefit. The book contains little that is both new and important.

The Biology of Pneumococcus. B. White, Ph.D., with the collaboration of E. S. Robinson, M.D., Ph.D. and L. A. Barnes, Ph.D. 799 pp. $4.50. Commonwealth Fund, New York, 1938.

Dr. White was the Director of the Serum Laboratories of the Massachusetts Department of Public Health and his successor, Dr. Elliott Robinson, is his chief collaborator in producing this book. Under the direction of Dr. White and Dr. Robinson, this laboratory, besides contributing to the study of immunity, took a prominent part in the Pneumonia Study and Service, 1931-35, of the Massachusetts Department of Public Health, under a grant from the Commonwealth Fund. Thus the book went to press with real authority, and it is not surprising that it proves to be valuable.

The purpose of the book is given in the foreword as a "stocktaking", that is to say, "To learn the exact quantity and quality" of what is known of the Pneumococcus and to appraise its worth". This difficult undertaking has been achieved without a discernible shadow of bias; nor is there any evident slurring of the supporting evidence for the varied and even conflicting views ably condensed from a vast literature. No recognizable phase or aspect of the subject is neglected, and much which was buried in the older literature is resuscitated.

The historical approach to each problem gives a perspective which could not be gained otherwise and the danger of a recital of dusty and mouldy historical facts, as evidence of priority, is completely avoided by a deft touch to an attractive style in presentation, by which the authors capture the attention so as to be read with pleasure. Though the 1,593 references to the literature, given in the bibliography and referred to in the text, testify that everyone who reads will learn, yet there is an added quality in the book that still more will be learned by those already possessed of knowledge of the subject.

It is probable that those of the laboratory will read this book more readily and perhaps gain more than will those of the ward, but so clear an exposition cannot fail to be understood. The book is as important to the clinician as to the bacteriologist, and a careful reading of it by both should stimulate a closer cooperation between laboratory and ward, to result in a higher standard of work in each department.

Deeply stirred, and it would be strange were it not so, through their extensive study of the profound knowledge of the Pneumococcus which has been gained in so few years, the authors refer to it more than once as "this very remarkable cell". There is a truer ring when the emphasis is placed on the "very remarkable" achievement of the patient and difficult work they have reviewed so ably.

The book does not neglect the practice of the knowledge it reviews, for it ends with an appendix, subdivided into 9 sections, which deals with "special methods used in the study of Pneumococcus and in the preparation of antipneumococcus serum". In their last chapter, which deals with "Unsolved Problems", the authors have distilled an essence of encouragement and hope from their studies, which is summarized in one sentence: "There are many inviting leads and, with the application of rapidly developing chemical and serological methods, the years to come should be even more fruitful than those of the past".

The bacteriology laboratory and the hospital which fails to possess this book is surely to be pitied.

Claude Bernard: Physiologist. J. M. D. Olmstead. 272 pp., illust. $4.00. Harper, New York, 1938.

We may be impressed with the importance of a man's life work, but an account of it leaves us cold unless we can see behind it into his character and soul, into the reasons for his actions, for his successes and his failures. The personal character of a man often explains what is otherwise inexplicable. Hence the value of a biography such as this. Previous to Doctor Olmstead's work the only "life" of Claude Bernard was that of Sir Michael Foster, and this was incomplete and, therefore, inadequate. It is also out of print. In preparing his biography of Bernard the author has gone to headquarters and utilized material which never before has been fully considered. His study of the Raffalovitch letters and the work of Doctor Genty, Librarian of the Academy of Medicine in Paris, in particular, has enabled him to present many facts about Bernard and give us light upon his personality as never before. We are taken from the cradle to the death-bed, always entertainingly, and learn why Bernard, despite his serious shortcomings as an experimenter, has become recognized as the founder of modern physiology, as a prophet of the doctrine of internal secretion. It is curious that Bernard frequently was faulty in his methods, frequently neglected to explore all the possibilities, his facts were not always facts, and yet by the exercise of a scientific imagination he was enabled to grasp and enunciate great and fundamental principles which hold today. It is this that has entitled him to a place among the immortals. In Professor Olmstead's book we find a complete analysis of the man and of his work. Not only the physiologist but the medical man generally will find inspiration here, and will gain by a fuller knowledge of one of the great "Masters in Medicine". This is decidedly a book to be read.

Treatment in General Practice. Various authors. Vol. 2, 426 pp. 10s. 6d. H. K. Lewis, London, 1936.

This is a continuation of a series of articles reprinted from the *British Medical Journal*. The subjects are numerous and dealt with in a pleasantly concise form. The book covers diseases of the nervous system, the digestive system, the blood and blood-forming organs, rheumatic and metabolic disease, and diseases of the kidneys. To these are added two articles on diagnosis, particularly on methods of x-ray examination and what they may be expected to show. The book should be of considerable value in general practice.

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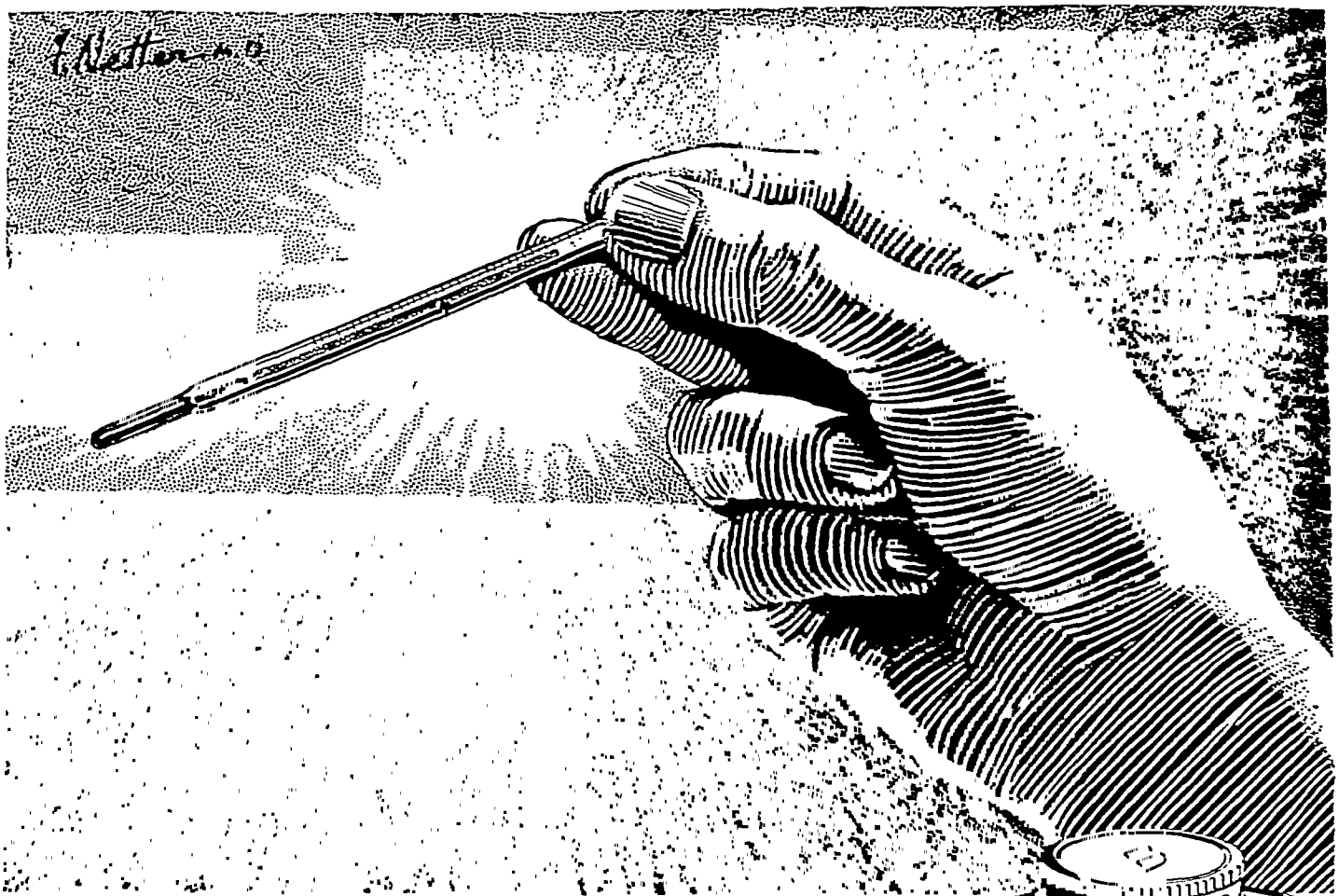
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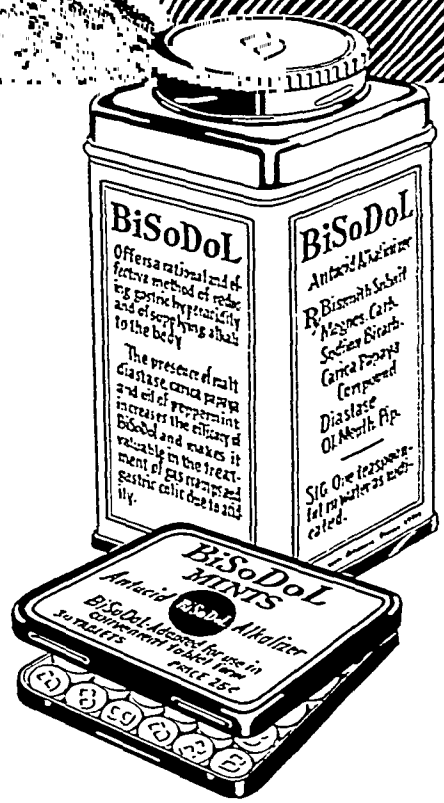
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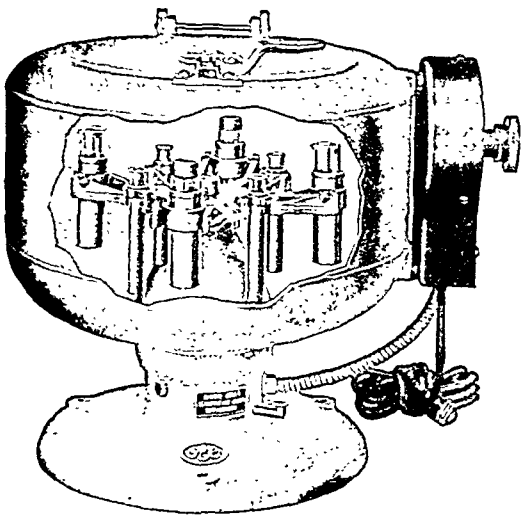
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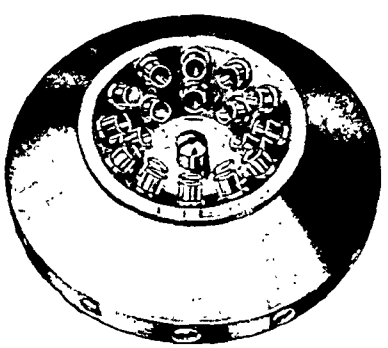
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...especially in combination with calcium, iodine and lysidine (ethylene-ethenyldiamine) in the form of

LYXANTHINE ASTIER

Relieves pain, subdues swelling, removes stiffness, increases articular motility, secures rapid removal of peri-articular infiltration, promotes active elimination of irritant and toxic waste.

ADMINISTERED PER OS

Non-irritant, does not disturb digestion. In usual dose, cholagogue; in larger dose, laxative. Usually renders use of salicylates, aspirin, or other analgesics unnecessary.

DOSE: 1 teaspoonful, *well dissolved* in a glass of water, on an empty stomach, every morning for 20 days. Rest 10 days. Repeat, if necessary.

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THE COUNCIL ON FOODS *REPORTS:*

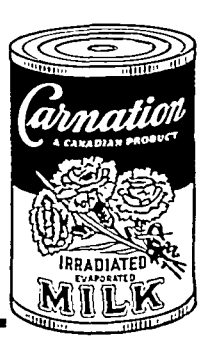
"There is, of course, abundant evidence that infants and very young children need extra vitamin D . . . It seems to the Council to be in the interests of the public as a whole to recognize and accept the fortification of food with vitamin D . . . Of all the common foods available, milk is most suitable as a carrier of added vitamin D."—COUNCIL ON FOODS, American Medical Association, *J.A.M.A.*, Jan. 16, 1937.



A BOOKLET FOR PHYSICIANS

You are invited to write for "Simplified Infant Feeding," an authoritative publication treating of the use of Irradiated Carnation Milk in normal and difficult feeding cases . . . Carnation Company, Ltd., Toronto, Ontario.

IN Irradiated Carnation Milk, the physician has available a milk of accepted quality, to which vitamin D has been added by exposure to ultra-violet rays. Bio-assays insure the vitamin-D potency of this milk, and utmost care in processing guarantees purity and uniformity in food value.



IRRADIATED
Carnation Milk
A CANADIAN PRODUCT — *"from contented cows"*

SORICIN

In the Treatment of INTESTINAL TOXEMIA

THE discovery of the unique properties of sodium ricinoleate by Larson opened up to the medical profession a new approach to the problem of toxic absorption. Soricin—sodium ricinoleate, made suitable for internal use is a non-toxic and relatively non-irritating fraction of castor oil soap. The administration of *sufficiently large doses* of Soricin has been shown by Burger and Dorst to detoxify intestinal organisms and their filtrates. Myers, MacQuiddy and Hamer have demonstrated that Soricin inhibits the action of the proteolytic and putrefactive bacteria upon the contents of the bowel.

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When requesting clinical packages and literature, please enclose professional card.

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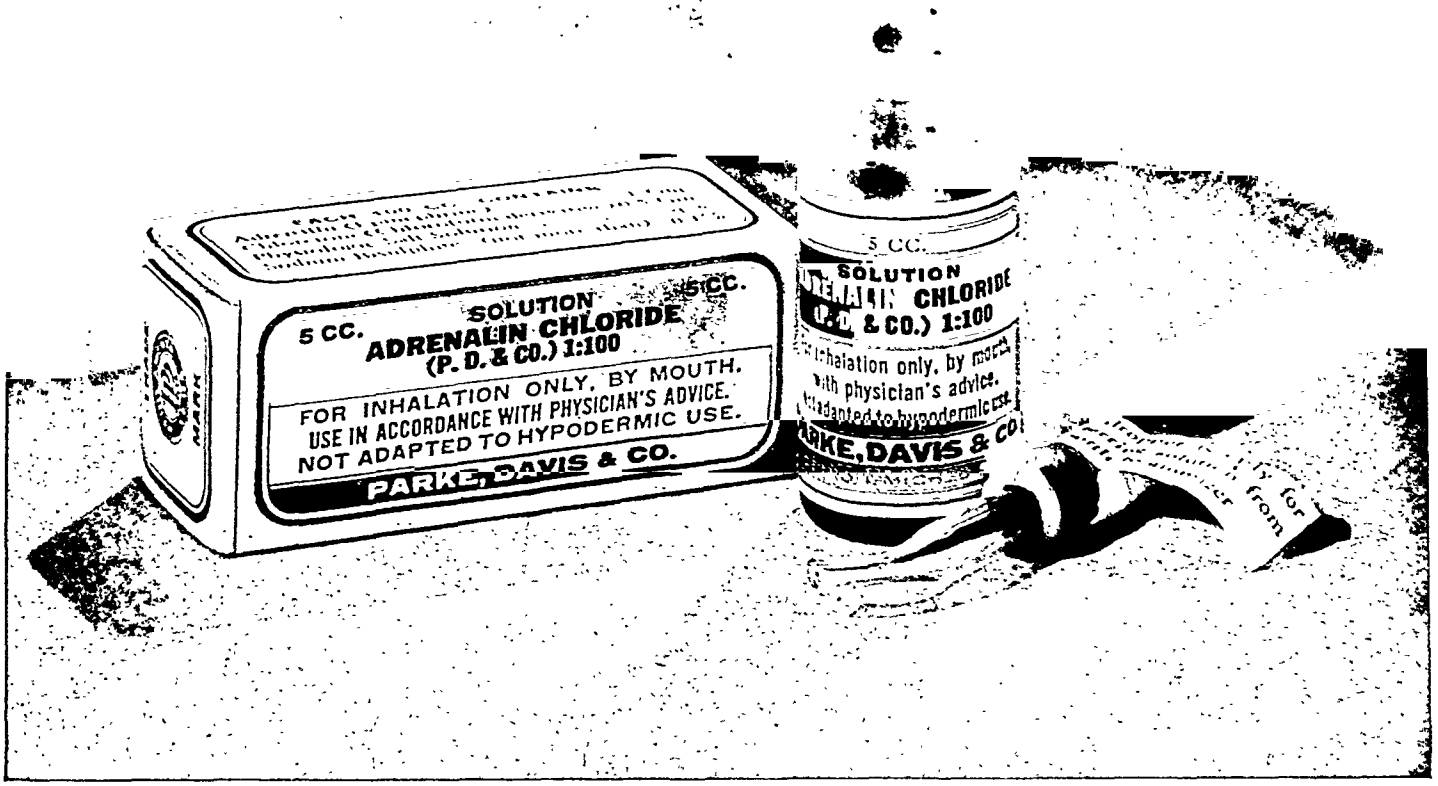
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THE oral inhalation of Adrenalin Chloride Solution 1:100 is promptly effective in relieving symptoms of bronchial asthma —in most cases results have been quite as satisfactory as those following hypodermic injection of the familiar 1:1000 solution. Nervousness and tachycardia, as well as other reactions which often accompany parenteral administration, are much less frequent following inhalation therapy. Discomfort and inconvenience of hypodermic injection are obviated by this new treatment.

Adrenalin is the Parke-Davis brand of Epinephrine U. S. P. Adrenalin Chloride Solution 1:100 is accepted by the Council on Pharmacy and Chemistry of the American Medical Association; it is supplied in 5-cc. vials, together with dropper for transferring the solution to a suitable atomizer, vaporizer, or nebulizer. The apparatus used must deliver a fine spray entirely free from drops.

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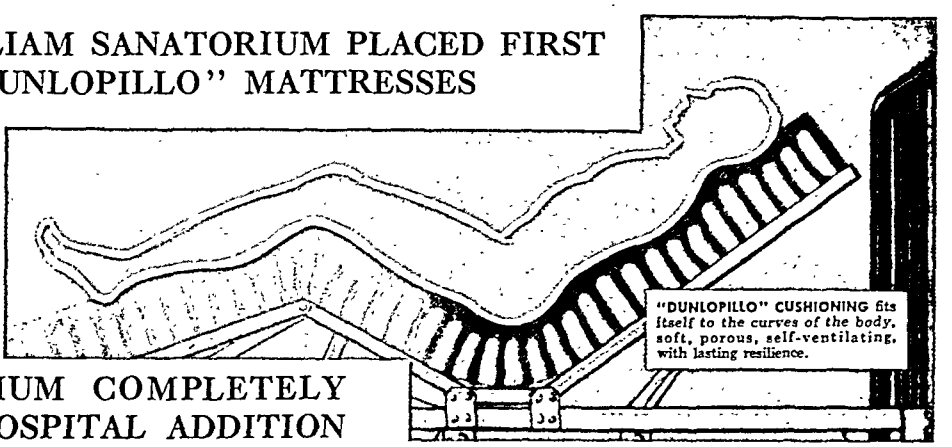
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THIS SANATORIUM COMPLETELY EQUIPS NEW HOSPITAL ADDITION WITH THESE FAMOUS MATTRESSES

Hospital executives everywhere have found that "Dunlopillo" Mattresses are scientifically designed for hospital use. The smooth, uniform and softly resilient surface conforms to body contour, eliminating localization of pressure and at the same time providing sufficient resistance to maintain correct posture.

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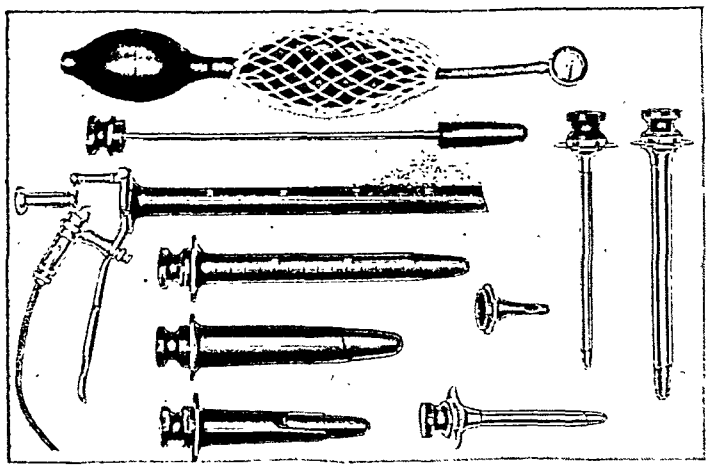
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For ALL Cavities...All Ages...Both Sexes



For Infants . . . . Children . . . . Adults

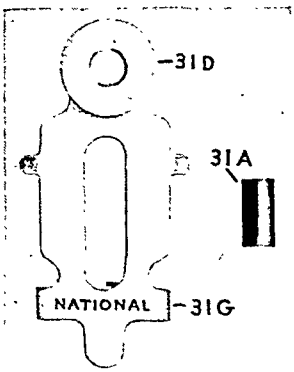
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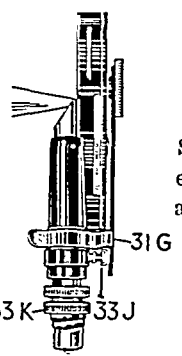
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Instantly converts a standard ophthalmoscope into a Polarized Ophthalmoscope.

Ordinary light, entering the eye, is in some portion reflected, reducing visibility of detail. Polarized Light overcomes this difficulty.

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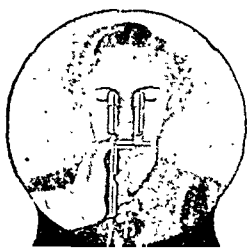
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Employs standard flashlight bulbs; no costly "specials". The ONLY transilluminator assuring real *Antrum* penetration because of the *combined intensity* of two bulbs.



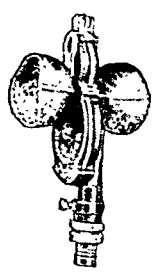
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The darkroom attachment brings out detail and assures telescopic sharpness of definition by excluding outside light.

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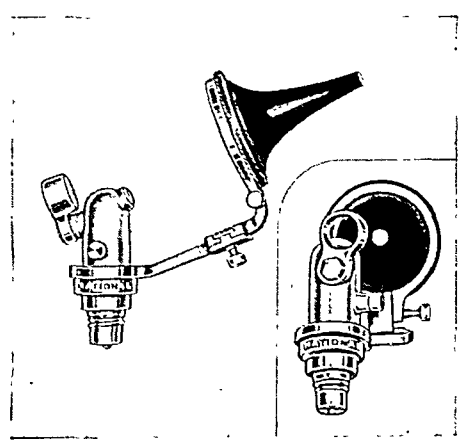
The ONLY instrument having 96 lens combinations plus Color Filters for red-free, daylight and clear light.

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A new method for treating the inside surfaces of specula. No halo; no glaring centre spot.

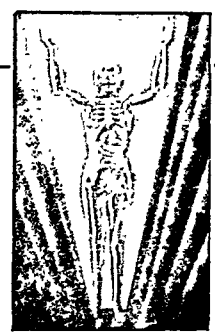
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This exhibit is now on a nation-wide tour in the interest of public health education.

ONE of the most significant observations made during public showings of the Camp Transparent Woman is the fact that "Judy O'Grady an' the Colonel's Lady" display the same intense interest in this remarkable exhibit—not to mention the same ignorance about the structure of their own bodies.

To date over two million persons have seen the Camp Transparent Woman. The medical profession realizes, of course, that just as this interest in the Camp Transparent Woman knows no social register—the *need* for correct scientific support is equally unmindful of social rank. The variety of Camp models embraces the same broad scope; for S. H. Camp & Company sponsor a special garment for every figure requirement.

It is important, therefore, to remind doctors that the sensible, low prices of Camp Supports bring them within reach of *all* who need them. Constant research and close collaboration with medical authorities help to make Camp Supports the very finest and most effective supports obtainable *at any price*. Fitters trained by the Camp organization are available in good stores throughout the country to assure doctors that their prescriptions will receive expert attention.

Camp Supports are never sold by door-to-door canvassers. It is not surprising therefore that many doctors, in prescribing scientific garments, make sure to *specify* Camp Supports.

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WORLD'S LARGEST MANUFACTURERS OF SURGICAL SUPPORTS

CANNED FOODS IN THE CONTROL OF LATENT AVITAMINOSES

● Considering the subject of avitaminoses in its entirety, the modern medical attitude is aptly expressed by the following statement: " . . . the mild or latent forms of the vitamin deficiencies are more important in practice at present than the fully developed cases. The latter are uncommon, are easily recognized and are usually promptly and adequately treated. On the other hand there is reason to believe that minimal or mild forms of these diseases are much more frequent, often escape recognition and, because of their insidious effect on large numbers of people, constitute a more serious problem than the occasional advanced cases." (1)

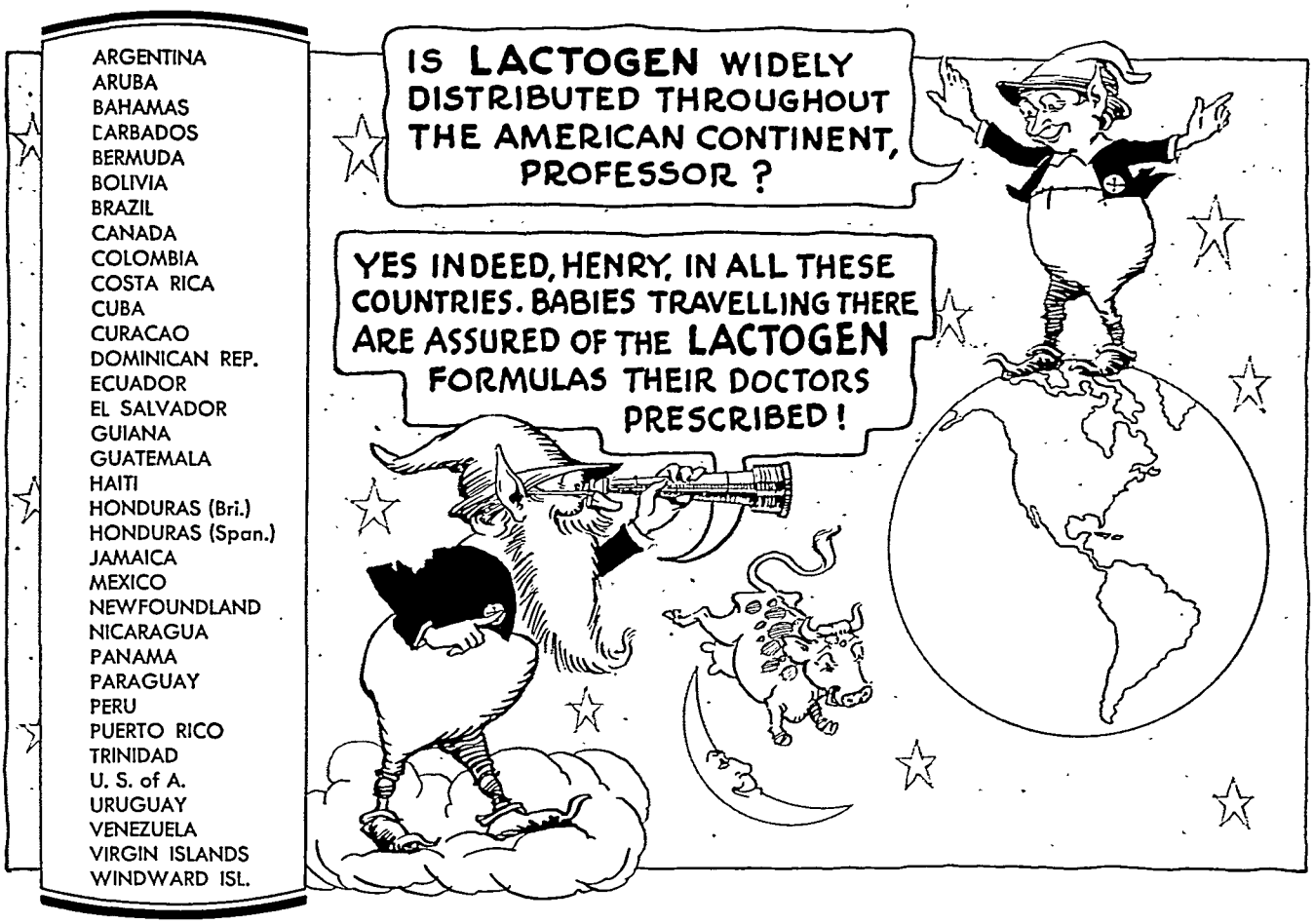
Consideration of this statement brings home the importance of optimum vitamin intake. Students of nutrition agree that in order to achieve this objective, a liberal and varied diet must be available. The constituents of the diet should be wholesome foods, the preparation of which has not materially reduced their intrinsic nutritive values. Commercially canned foods fall well within this classification.

Modern canning procedures are designed to protect the vitamin potencies of the food. Recent reports in the scientific literature indicate the success attained in retaining vitamin values in commercially canned foods. (2)

In general, the control of latent avitaminoses and the advancement of positive health appear to be largely matters of practical application of facts made available by the modern science of nutrition. We wish to direct attention to the part which the wide variety of canned foods available on the Canadian market may play in establishing dietary regimes calculated to control the avitaminoses.

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(1) 1937. J. Am. Med. Assn. 108, 15.
(2) 1936. J. Nutr. 12, 405.
(2) 1936. J. Am. Diet. Assn. 12, 231.
1936. J. Nutrl. 11, 383.
1936. Ind. Eng. Chem. 28, 1009.
(2) 1935. J. Home Econ. 27, 658.
1935. U. S. Pub. Health Rpts. 50, 1333.
1935. Am. J. Pub. Health 25, 1340.



When your choice is powdered milk prescribe a milk modified by the addition of milk sugar and homogenized milk fat

Realizing the need for a properly modified cow's milk in powdered form, that is, a product containing the milk constituents in the proper proportions for Infant Feeding but containing nothing but milk constituents, Nestlé's Milk Products, Inc., devised their product known as LACTOGEN, and its reception and increasing use by the medical profession is sufficient proof that it fills an important need and that its quality and reliability are all that can be desired.

A spray dried Cow's Milk modified by the addition of milk fat and milk sugar. The only available product made entirely from *milk* which, when liquefied, results in a formula approximating Woman's Milk in percentages of milk fat, milk protein, milk sugar and minerals (ash).

ACCEPTED AMERICAN MEDICAL ASSN. Committee on Foods

For Literature and Samples of LACTOGEN, please send professional blank to

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PERANDREN

"Ciba"

(Testosterone propionate)

Conclusive clinical reports on Perandren are becoming very numerous, and its practical application in a number of conditions and diseases arising from disordered internal secretions in the male, and to a lesser extent in the female, are being well-defined. It has, further, been established that it is desirable to have the product also in higher doses, therefore, besides the 5 mgrm., ampoules **containing 10 and 25 mgrms., are now available.**

Further, largely increased manufacturing of Perandren has made it possible to **reduce the price** of the 5 mgrm. ampoules by about 50%, and to establish for the 10 and 25 mgrms. the lowest possible figures.

Available in ampoules of 5, 10 and 25 mgrms. | Ask today for detailed literature. | *Packages: cartons of 3 and 6 ampoules*



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Just an old Crank

IN 1858 Gail Borden began cracking down on people who tried to buck or dodge the rules he laid down for dairy cleanliness.

It was all uphill work. He was roundly denounced as a dictatorial old crank. But the principles that Gail Borden battled to enforce eventually gave us new standards of milk quality and purity. And many of those principles are now *laws* protecting the milk supply of provinces, counties, municipalities.

Today's Borden Company is just as uncompromising in its attitude towards cleanliness. We're proud to seem, to people who don't understand us, like an organization of incurable "old cranks". And while the maintenance of high quality and purity is vital to the Borden code, equally vital to this code is our endless search for new safeguards for every Borden dairy product.

THE BORDEN COMPANY LIMITED

YARDLEY HOUSE

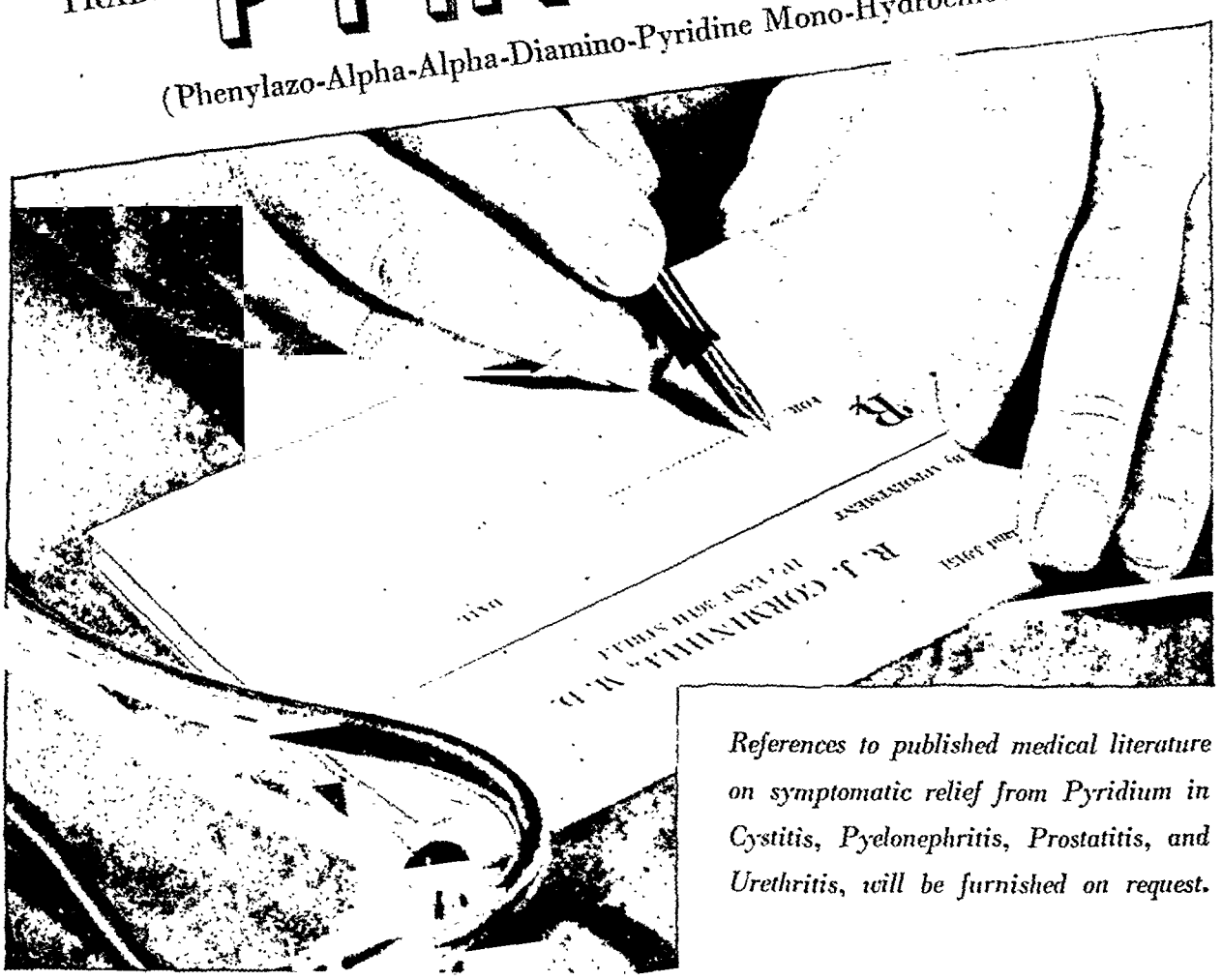
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When Urogenital Symptoms Harass the Patient

More than a decade of experience has demonstrated that distressing symptoms in urogenital infections such as frequent, urgent, painful urination, and tenesmus, may be relieved promptly by the oral administration of

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(Phenylazo-Alpha-Alpha-Diamino-Pyridine Mono-Hydrochloride)



References to published medical literature on symptomatic relief from Pyridium in Cystitis, Pyelonephritis, Prostatitis, and Urethritis, will be furnished on request.

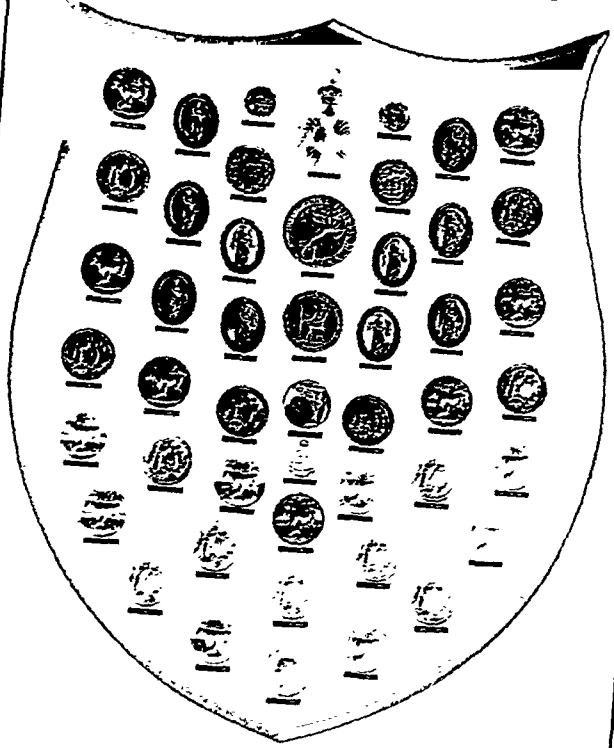
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By Appointment to H.M. the King of Iraq

By Appointment to H.M. the King of Yugoslavia

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137 HONORS and AWARDS

COW & GATE MILK FOODS

For Infants and Invalids

WHOLE MILK FOOD

For normal, healthy, artificially-fed Infants. Safe, reliable, standardized.

CASINAC The Protein Milk Food.

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PARTLY SKIMMED FOOD With or without extra addition of Lactose. For Fat Intolerance or as an intermediary from special food diet to Whole Milk Food.

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1 oz. of All-Bran contains as much "bulk" as 7¼ oz. of raw cabbage.

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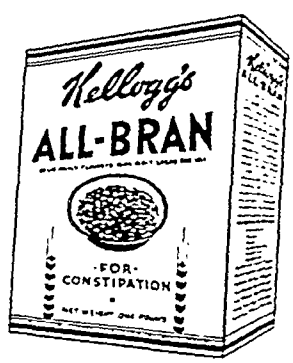
1 oz. of All-Bran contains more Vitamin B_1 than 2½ oz. of whole egg.

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1 oz. of All-Bran contains as much iron as 6½ oz. of fresh spinach.

When you recommend—or use—Kellogg's All-Bran, you are summoning the aid of three important benefits. This natural laxative cereal supplies these great helps in relieving common constipation: "bulk" and vitamin B_1, the intestinal tonic vitamin. As an extra bonus, All-Bran gives a plentiful supply of iron. Made by Kellogg in London, Ontario.

THE NATURAL LAXATIVE CEREAL



SICK ROOM

Lavoris is soothing and refreshing. Used as a daily mouthwash, gargle or atomizer solution it adds much to the patient's comfort.

The pleasant flavour enlists the cooperation of patients, both young and old. It aids in preventing absorption and ingestion of toxic matter by keeping the parts more sanitary, and promptly corrects disagreeable breath and taste.

(LAV, to wash

LAVORIS

ORIS, the mouth)

Professional sample on request

LAVORIS CHEMICAL COMPANY
LIMITED
92 Jarvis Street, Toronto, Canada

★SODASORB

The recognized standard absorbent for Carbon Dioxide

ECONOMICAL TO USE because of its absorptive capacity.

FREEDOM FROM CAKING allows steady, even flow of gas.

MINIMUM HEATING gives greater comfort to patient.

NON-DELIQUESCENT—makes apparatus easy to clean.

★*An improved type of Wilson Soda Lime*

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OF CANADA, LTD.
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Magnolax absorbs intestinal toxins

A unique therapeutic effect distinguishes Magnolax—a stable emulsion of liquid paraffin and milk of magnesia—from ordinary laxatives and cathartics. This property makes it of supreme value in the treatment of intestinal stasis.

Magnolax absorbs and carries out of the system various harmful and putrefactive products, such as indol, phenols and other intestinal toxins.

And Magnolax does not contain phenolphthalein which may irritate the colon and cause damage to the liver in sensitive persons, especially children.

Samples for clinical trial to physicians on request.

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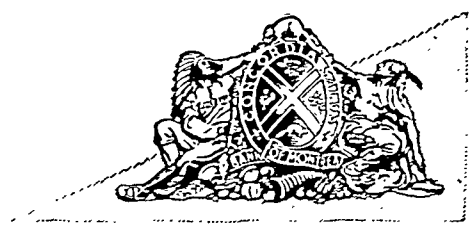
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IN CONNECTION WITH THE UNIVERSITY AND ROYAL COLLEGES, 1938

The POST-GRADUATE COURSES to be held this year comprise:

(1) A COURSE IN OBSTETRICS AND GYNÆCOLOGY from July 11th to July 29th. Fee: £10. 10s.

(2) A GENERAL PRACTITIONERS' COURSE from August 15th to September 10th. Fee: £10. 10s. for whole course; £6. 6s. for two weeks.

(3) A GENERAL SURGICAL COURSE from August 15th to September 10th. Fee: £10. 10s. for whole course; £6. 6s. for two weeks.

(4) A COURSE ON INTERNAL MEDICINE from October 17th to December 10th. Fee: £15. 15s.

In addition to the above, Courses in the following Subjects will be held at various periods of the year:

INTERPRETATION AND SIGNIFICANCE OF MODERN DIAGNOSTIC METHODS. Fee: £3. 3s.
DISEASES OF THE BLOOD. Fee: £3. 3s.
ENDOCRINOLOGY. Fee: £3. 3s.
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UROLOGY. Fee: £10. 10s.
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OPHTHALMOSCOPY. Fee: £5. 5s.
UROLOGICAL SURGERY. Fee: £3 3s.
TREATMENT OF FRACTURES AND ORTHOPÆDICS. Fee: £3. 3s.
NEUROLOGICAL SURGERY. Fee: £2. 2s.
DISEASES OF NOSE, EAR, AND LARYNX (Royal Infirmary). Fee: £10. 10s.
DISEASES OF EAR, NOSE, AND THROAT (Ear and Throat Dispensary). Fee: £4. 4s.
OPERATIVE SURGERY OF THE EAR. Fee: £2. 2s.
VENEREAL DISEASES. Fee: £10. 10s.
SURGICAL PATHOLOGY. Fee: £4. 4s.
ORTHOPÆDIC SURGERY. Fee: £4. 4s.
CLINICAL MEDICINE, INCLUDING CHILD LIFE AND HEALTH. Fee: £5. 5s.
CLINICAL SURGERY. Fee: £4. 4s.
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The Courses will be held only if a sufficient number of entries are received.

Further particulars may be had on application to the Hon. Secretary, Post-Graduate Courses in Medicine, University New Buildings, Edinburgh

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The History of The Canadian Medical Association?

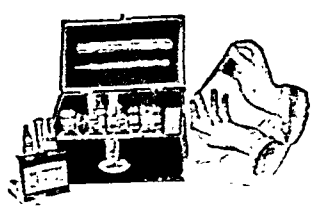
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LaMotte Blood Sugar Outfit

For rapid estimation of blood sugar in determining sugar tolerance for diabetic patient. Uses only few drops of finger blood. Permits tests at close intervals. Invaluable for infant cases. Accurate to 10 mg. of sugar per 100 c.c. of blood. Direct result without calculations. Only 20 minutes required for complete test. Complete with instructions, price $24.00, f.o.b. Baltimore, Maryland.

LaMOTTE CHEMICAL PRODUCTS CO.

448 Light St. Baltimore, Md., U.S.A.

Royal College of Physicians and Surgeons of Canada

EXAMINATIONS — OCTOBER 1938

The Primary and Final Examinations leading to the Diploma of Fellow will be held on the following dates:—

Written Examinations in both the Primary and Final subjects on October 3rd, 4th and 5th — in Vancouver, Edmonton, Saskatoon, Winnipeg, Toronto, Montreal, Quebec City, Halifax.

Oral Examinations in the Primary Subjects on October 20th in Winnipeg and October 22nd in Toronto.

Oral and Clinical Examinations in the Final subjects on October 24th in Winnipeg and October 26th in Toronto.

The Annual Meeting of the College will be held in Ottawa on October 29th.

Candidates who are graduates of 1930 or prior thereto of a Medical School or University approved by Council shall not be required to take the Primary Examination, but shall in the Final Examination demonstrate a general and practical knowledge of the clinical application of Anatomy and Physiology.

This special examination shall be conducted by clinicians.

The privilege of this subsection of the Bylaws shall become obsolete on December 1st, 1940.

Address all communications to:

Warren S. Lyman, M.D., F.R.C.P.(C.)
Honorary Secretary,
292 Somerset Street West
Ottawa – Canada

Further details will appear in subsequent issues.

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Department of Medicine

GASTROENTEROLOGY

September 6 to 30, 1938

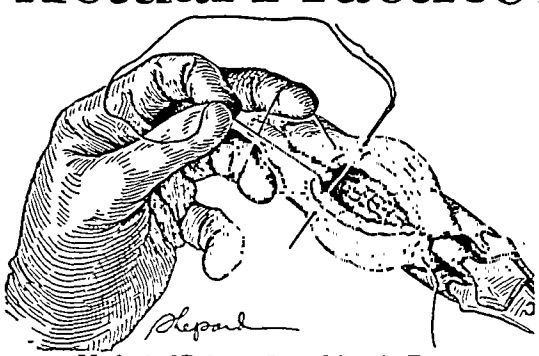
A presentation designed to give a working knowledge of the modern methods of diagnosis and treatment of diseases of the gastrointestinal tract, including clinical parasitology and surgical and medical aspects of the various conditions. Laboratory and diagnostic procedures — clinical roentgenology, technique of duodenal intubation and biliary drainage, and sigmoidoscopy — will be included. Special consideration will be given to the relation of allergy, endocrinology, and mental and nervous disorders to gastrointestinal disturbances. Demonstrations on ward and clinic patients.

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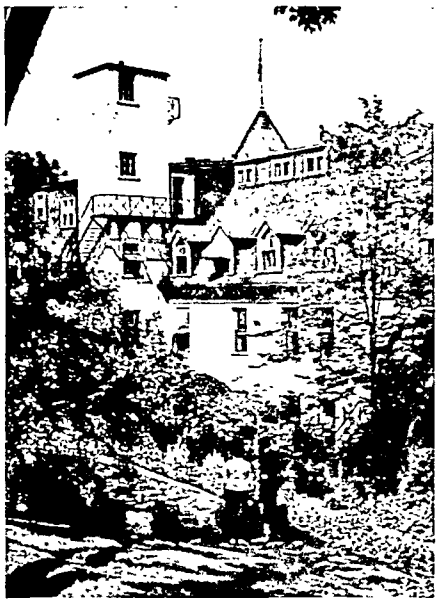
Medicine, Surgery and the Specialties...	June 27 to July 9—Prince of Wales' General Hospital. All day. Fee £5. 5s.
Proctology	July 4 to July 9—St. Mark's Hospital. All day. Fee £3. 3s.
Urology	July 11 to July 30—All Saints Hospital. Afternoons. Fee £2. 12s. 6d.
Dermatology	July 11 to July 23—Hospital for Diseases of the Skin, Blackfriars. Afternoons. Fee £1. 1s.
M.R.C.P. (Chest)	September 5 to October 1—Brompton Hospital. Two afternoons weekly. 5.15 to 6.15 p.m. Fee £3. 13s. 6d. *(Maximum of 6 per class).*
Plastic Surgery	September 14 and September 15—All day. Fee £2. 2s. *(Maximum of 8).*
Children's Diseases (Suitable for D.C.H.)...	September 19 to September 24—Infants' Hospital. All day. Fee £3. 3s. *(Maximum of 15).*
M.R.C.P. (Neurology)	September 19 to October 1—West End Hospital for Nervous Diseases. Afternoons. Fee £3. 10s. *(Maximum of 10).*
M.R.C.P. (Tuberculosis)	October 1—Preston Hall, Maidstone. All day. 11 a.m. to 5 p.m. Fee 10s. 6d. *(Maximum of 8).* If sufficient demand, demonstrations repeated on October 8.
*Cardiology	October 3 to October 15—National Hospital for Diseases of the Heart. All day. Fee £7. 7s. *(Maximum of 20).*
Medicine, Surgery and the Specialties	October 3 to October 8—Metropolitan Hospital. All day. Fee £3. 3s.
*Dermatology	October 3 to October 31—St. John's Hospital. Afternoons. Fee £1. 1s. per month. November 1 to November 30— (Practical Pathology arranged. Fee £4. 4s.).
Gynæcology (Suitable for M.C.O.G.)	October 10 to October 22—Chelsea Hospital for Women. All day. Fee £5. 5s. *(Maximum of 15).*
Chest Diseases	October 24 to October 29—Brompton Hospital. All day. Fee £3. 3s.
Urology	October 24 to November 5—St. Peter's Hospital. All day. Fee £5. 5s. *(Maximum of 8).*
Medicine, Surgery and Gynæcology	November 7 to November 19—Royal Waterloo Hospital. All day. Fee £3. 3s.

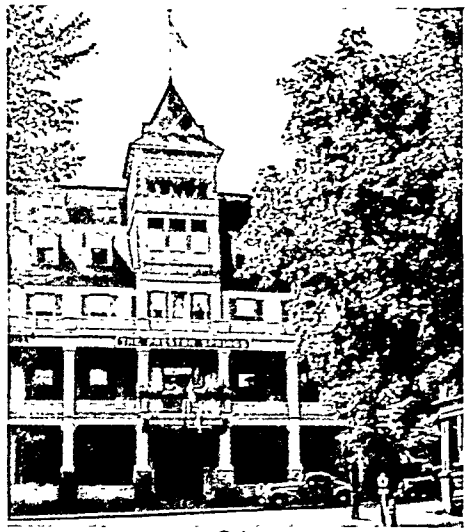
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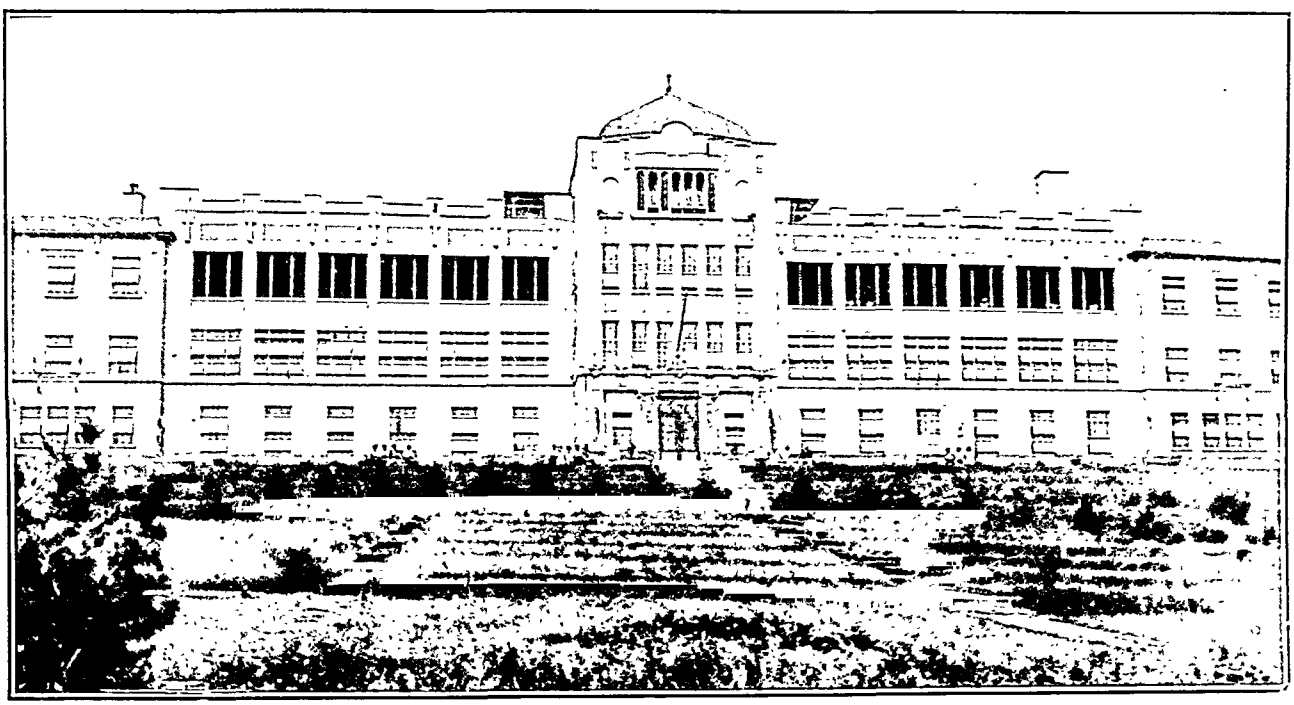
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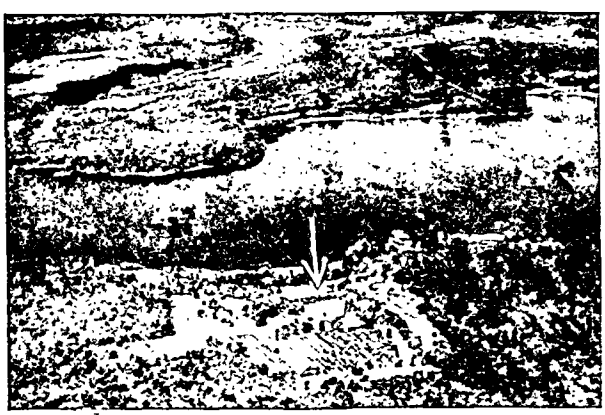
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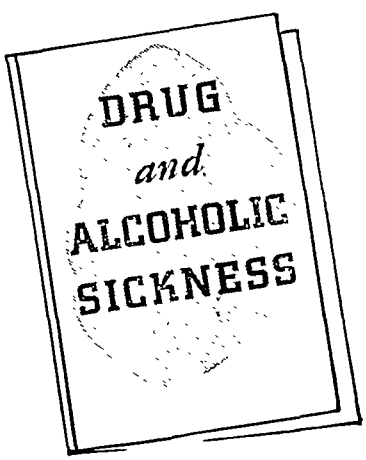
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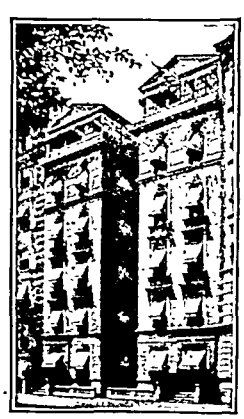
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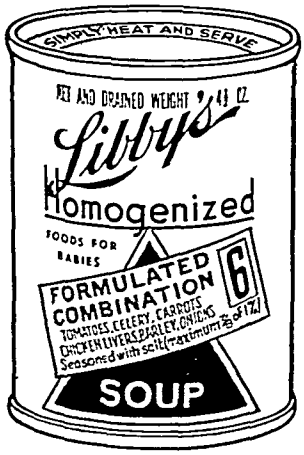


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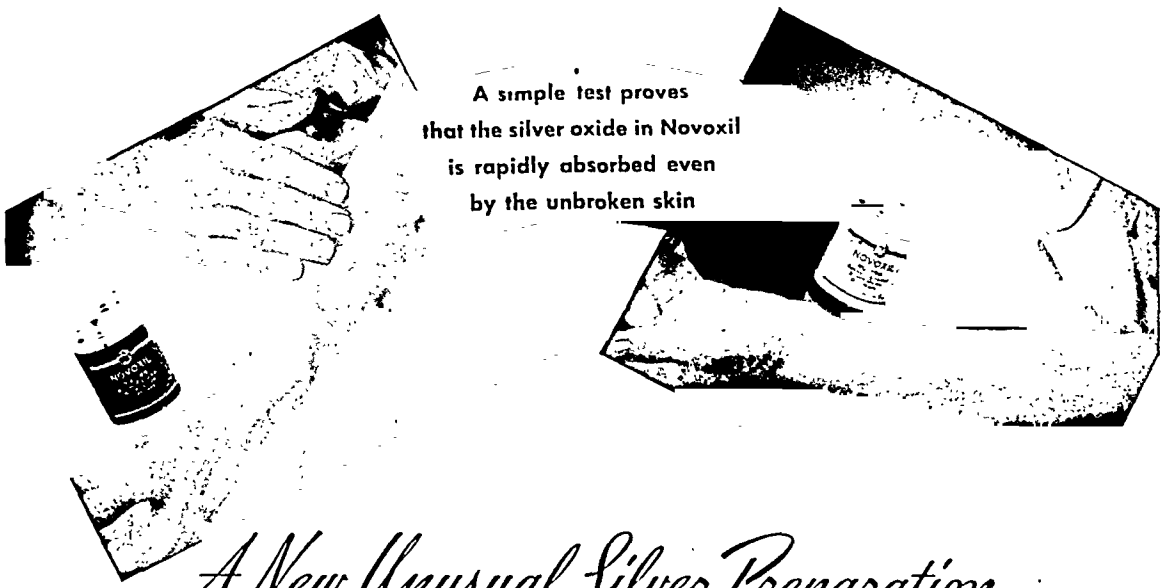
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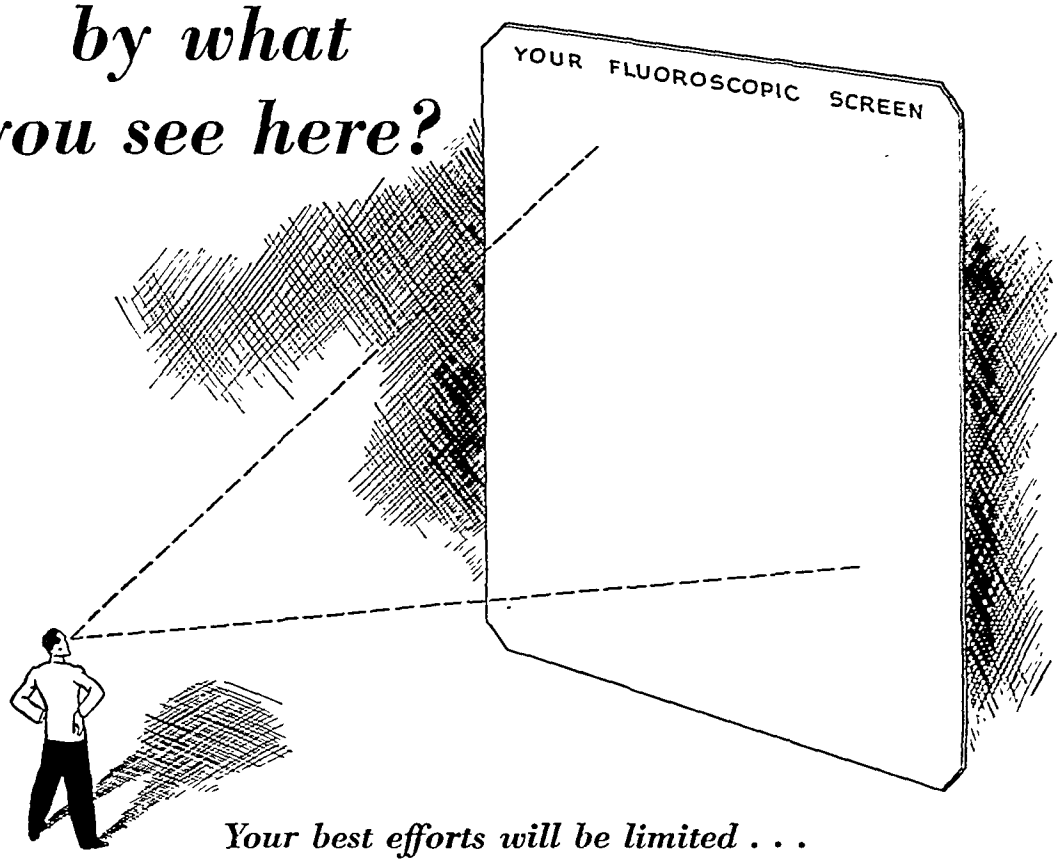
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Antiphlogistine

is indicated in the treatment of

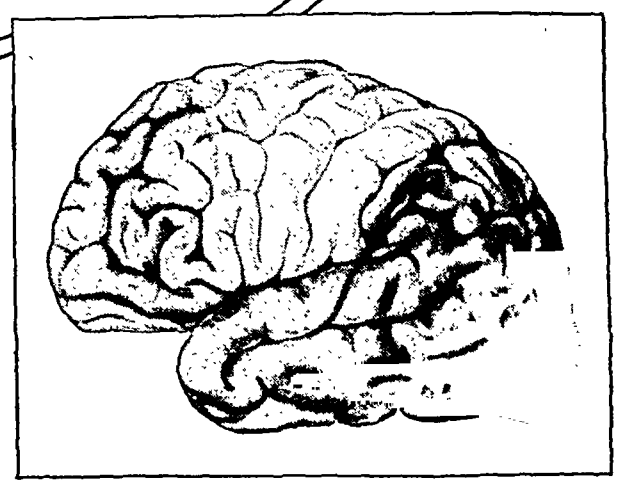
SPRAINS *and* **STRAINS**

and in all those cases where the application of prolonged moist heat is beneficial. • It is also a bacteriostatic, repair-stimulating surgical dressing, for direct application to open wounds and raw surfaces, and is especially appreciated by children, because it does not smart or pain.

THE DENVER CHEMICAL MFG. CO., 153 Lagauchetiere St. W., Montreal

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This synergistic combination of pure alkali and alkaline earth bromides is a safe dependable sedative and hypnotic without harmful side or after effects.

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